

DIV. OF FISHES

# COMMERCIAL FISHERIES REVIEW



UNIVERSITY  
OF MICHIGAN

FEB 26 1957

MUSEUMS  
LIBRARY

Vol. 18, No. 12

DECEMBER 1956

FISH and WILDLIFE SERVICE  
United States Department of the Interior  
Washington, D.C.



# COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries  
prepared in the BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor

J. Pileggi, Associate Editor H. M. Bearse, Assistant Editor

Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C.

Publication of material from sources outside the Service is not an endorsement. The Service is not responsible for the accuracy of facts, views, or opinions contained in material from outside sources.

Although the contents of this publication have not been copyrighted and may be reprinted freely, reference to the source will be appreciated.

The printing of this publication has been approved by the Director of the Bureau of the Budget, August 2, 1955. (8/31/57)

## CONTENTS

COVER: Royal-red shrimp (*Hymenopenaeus robustus*) caught in a depth of over 200 fathoms off Dry Tortugas by the Service's exploratory fishing vessel Oregon. These shrimp, when headed, will average 21-30 count. (See pp. 1-12 of this issue.)

	Page		Page
Preliminary Results of Deep-Water Exploration for Shrimp in the Gulf of Mexico by the M/V Oregon (1950-1956), by Harvey R. Bullis, Jr. ....	1		
Iron Sulfide Discoloration of Tuna Cans: No. 4 - Effect of Retorting and Cooling Canned Fish, by George M. Pigott and M. E. Stansby .....	13		
Pilot-Plant Fish-Meal Dryer, by Lynne G. McKee and Neva L. Karrick .....	17		
RESEARCH IN SERVICE LABORATORIES: .....	24	TRENDS AND DEVELOPMENTS (Contd.):	
Variation in Proximate Composition of Right and Left Fillets of Rockfish ( <i>Sebastes pinniger</i> ) and Dover Sole ( <i>Microstomus pacificus</i> ) .....	24	Fish Sticks First to Bear U. S. Shield and Grade Labelling .....	37
Fish Composition Studies .....	26	Georges Bank Hydrographic Resurvey Planned ..	37
Antibiotics for Fishery Products Preservation ...	27	Great Lakes Fishery Investigations: Survey of Saginaw Bay Continued by M/V Cisco (Cruise 7) .....	39
Technical Note No. 35 - Improved Workmen's Stand for Processing Plants .....	28	Hawaii: Commercial Fisheries Catch for 1955 .....	40
TRENDS AND DEVELOPMENTS: .....	30	Marketing Prospects for Edible Fishery Products, Winter 1956/57. ....	40
Antibiotics in Food Industry Discussed at Symposium .....	30	Maine Sardines: Canned Sardine Stocks, November 1, 1956 ....	41
Cans--Shipments for Fishery Products, January-August 1956 .....	30	Canning Season Ended December 1 with Fair Pack. ....	42
California: Albacore Tuna Tagged off Southern California (M/V Nautilus Cruise 56-N-2) .....	31	North Atlantic Fisheries Exploration and Gear Research: Bluefin Tuna Commercial Distribution in Northwest Atlantic Surveyed by M/V Delaware (Cruise 27) .....	42
Abundance Survey of Sardines, Jack and Pacific Mackerel, and Anchovies Continued by M/V Scofield (Cruise 5) .....	31	North Atlantic Fisheries Investigations: Studies Into Feeding Habits of Local Fishes (M/V T-79 Cruise 8) .....	44
New Techniques in Ocean Electro-Fishing Developed .....	32	Underwater Television Observation of Fish Captured by Otter Trawl .....	44
Pelagic Fish Distribution Study (Airplane Spotting Flight 56-8) .....	33	North Atlantic Herring Research: Setting of Purse Seine From Deck of Dragger Tested (M/V Metacomet Cruise 9) .....	45
Canned Fish Consumer Preference Study: Canned Fish and Shellfish Generally Available at Retail .....	35	North Pacific Exploratory Fishery Program: Bottom Fish Grounds off Southeastern Alaska Surveyed by M/V John N. Cobb (Cruise 29) ...	46
Housewives Buy Two or More Cans of Pet Food at a Time .....	35	Pacific Oceanic Fishery Investigations: Oceanography of Pacific Equatorial Region Surveyed (Hugh M. Smith Cruise 35) .....	47
Federal Purchases of Fishery Products: Canned Fishery Products Purchased Through Quartermaster Market Center, July-September 1956 .....	36	Skipjack Tuna Tagged With Harpoon-Type Tag Recovered .....	48
Fresh and Frozen Fishery Products Purchased by the Department of Defense, September 1956 ...	36		
New Agency Replaces Quartermaster Market Center System .....	37		

# COMMERCIAL FISHERIES REVIEW

December 1956

Washington 25, D.C.

Vol.18, No.12

## PRELIMINARY RESULTS OF DEEP-WATER EXPLORATION FOR SHRIMP IN THE GULF OF MEXICO BY THE M/V OREGON (1950-1956)

By Harvey R. Bullis, Jr.\*

### INTRODUCTION

The deep-water royal-red shrimp, *Hymenopenaeus robustus*, is a bottom-dwelling species, of a size equivalent to the present commercial shrimp species of the Gulf of Mexico. Preliminary accounts of explorations for this species by the Service's exploratory fishing vessel *Oregon* have been given by Springer and Bullis (1951 and 1954), and Springer (1954).

The first catches of royal-red shrimp in the Gulf were made while the *Oregon* was primarily engaged in explorations for brown-grooved shrimp, *Penaeus aztecus*. In July 1950, a series of trawling stations was made off the Mississippi Delta, in increasing depth intervals beyond the limits of the continental shelf. At that time, small numbers of royal-red shrimp were taken in depths of 195 to 232 fathoms. During the following four years, which were primarily devoted to exploration for shallower-water shrimp and for tuna, a short period of each trawling cruise was spent on additional deep-water dragging. By the end of

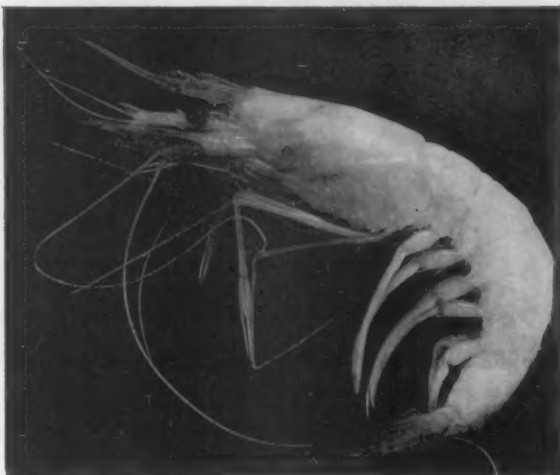


Fig. 1 - The deep-water royal-red shrimp (*Hymenopenaeus robustus*).

1954, exploratory coverage of the 100- to 300-fathom range in the eastern Gulf between the Mississippi Delta and Key West, and along the Texas Coast was extensive, with limited work carried out to depths of 500 fathoms. Only scattered drags were made off Louisiana, the Campeche Banks, and in the Gulf of Campeche, where generally poor trawling bottom was encountered.

The distributional picture that emerged from this work showed royal-red shrimp to be present throughout the Gulf of Mexico on all types of bottom in a depth range of 190 to 270 fathoms, with a maximum range of 150 to 400 fathoms.

\* Chief, Gulf Fisheries Exploration and Gear Research, Exploratory Fishing and Gear Development Section, Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Pascagoula, Miss.

In September 1952, a small amount of fishing for royal-red shrimp was carried out in the north Gulf by the M/V Antillas, owned by the Gibbs Corporation of Jacksonville, Fla., and operating in cooperation with the Fish and Wildlife Service

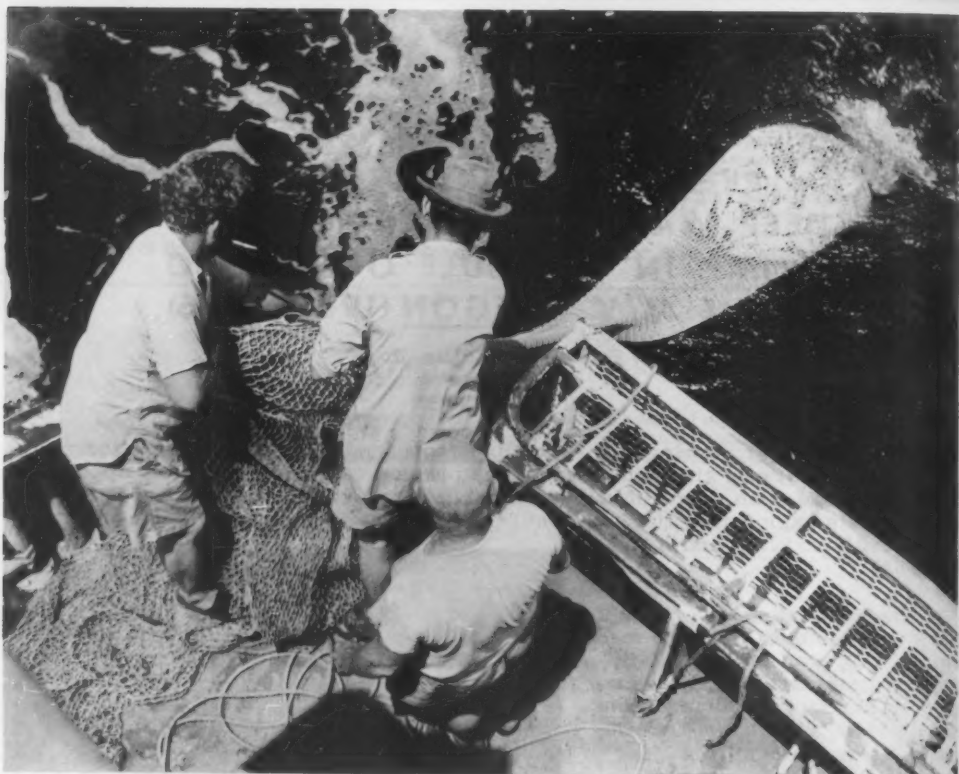


Fig. 2 - Hauling in the cod end of a 40-foot flat trawl after an exploratory drag in the 200-fathom depth range.

(Carlson 1953). Several drags were made off Louisiana, Mississippi, Alabama, and western Florida, in the general depth ranges suggested by prior catches of the Oregon. The best catches were approximately 70 pounds an hour along the 200-fathom curve east of the Mississippi Delta.

In 1955, with the completion of shallow-water shrimp exploration in the Gulf, a series of cruises were programmed for the Oregon to provide a more comprehensive picture of the commercial potentialities of royal-red shrimp. The following work plan was subsequently followed, using commercial-scale gear whenever suitable trawling conditions were found.

In March 1955, a series of 34 trawling stations were made in depths of 160 to 270 fathoms between the Mississippi Delta and Cape San Blas, Fla. In July, round-the-clock trawling was attempted in depths of 190 to 300 fathoms south and south-east of Dry Tortugas. Extensive gear damage was sustained while making 16 drags, and work was stopped ahead of schedule. Following this work, some exploration of the 200-fathom depth range was carried out on the eastern end of Nicolas Channel along the north coast of Cuba, and in the Straits of Florida off Key Largo. In



September, exploratory coverage was extended along the Louisiana Coast, where generally poor trawling bottom was encountered. During the last half of the cruise, the Delta to Cape San Blas area was reworked using 80-foot balloon trawls.

In March 1956, further commercial-fishing trials were run off the Mississippi and Alabama coasts. Six days of round-the-clock fishing were carried out through a two-week period of generally bad weather. In May, three weeks were spent trawling along the Mississippi, Louisiana, and Texas coasts. In June, simulated commercial-scale fishing was tried in the two restricted areas off Mobile and Dry



Fig. 3 - A moderate catch of mostly trash fish species in the cod-end of an 80-foot balloon trawl prior to dumping on dock.

Tortugas. These areas, based on previous results, appeared most promising for immediate exploitation. Following selection of optimum trawling depths, three days of round-the-clock fishing were carried out in each area.

To date, 308 trawling stations have been made by the Oregon between the 100- and 500-fathom curves in the Gulf of Mexico.

In the early months of 1956, a supplementary exploratory program was established on the South Atlantic Coast, to obtain information on the possible existence of deep-water shrimp resources in that area. The program has been financed with funds provided by the Saltonstall-Kennedy Act of 1954, and has operated with the chartered M/V Pelican and M/V Combat. This work is currently under way, and has so far led to the discovery of promising royal-red shrimp grounds. Results will be reported in detail in the near future.

## GEAR AND METHODS

Several shrimp trawl modifications have been tried with varying degrees of success in the deep-water dragging. After initial trials with other types, a 40-foot flat trawl was used for all exploratory work (for a description of this trawl see Fishery Leaflet 394, pp. 7-10). This net has worked well under almost every trawling condition. It was towed on a single trawling warp rigged with a 25-fathom bridle, using weighted 5- and 6-foot trawl doors.

In each area explored, efforts were made to complete a series of trawl drags in close depth intervals. After the general royal-red shrimp depth range had been determined, 5- to 10-fathom depth intervals were trawled between the 150- and 300-fathom curves, in several different areas. Vessel courses while trawling were determined by depth-recorder readings. In general, this practice worked very well; however, occasionally the trawl was dragged into small "dead-end" crevices along the slope, which resulted in bogging and loss of gear.

It was our general practice to survey the intended trawling area using a depth recorder prior to lowering the gear. If recorder indications showed apparently trawlable bottom, the net was lowered and the trawling warp was run out while the vessel ran ahead at 7 to 8 knots. It was necessary to maintain a slight drag with the winch brake to prevent trawling warp blacklashes. A trawl cable meter was used to determine the length of wire going out; and when all but 100 fathoms of warp had been set, the vessel was slowed to trawling speed as the remaining warp was run out.

Exploratory drags were of 1- to 3-hours duration, usually depending upon the appearance of the bottom as shown by the depth recorder.

Occasionally, erratic trawl performance in usually trawlable areas indicated strong subsurface or bottom currents. (On one occasion off Freeport, Tex., five attempts were made to get a 40-foot trawl and heavily-weighted 5-foot doors on the bottom. Up to 800 fathoms of warp were run out without making a successful drag). Optimum warp length for a given depth has been found to vary, depending on weather and current conditions. Proper wire-depth ratio is important since water-hauls and bogging the trawl doors and net are the result of too little or too much warp. An approximate ratio of wire length to depth for the 200- to 250-fathom range is the depth times 3, necessitating winch drums that can hold up to 750 fathoms of  $\frac{1}{2}$  inch-diameter wire. Minor adjustments in wire length can be made on subsequent drags, as indicated by catch and trawl performance.

Numerous changes in the design and rigging of trawl doors have been tried in an effort to reduce the high incidence of bogging gear in the soft mud off the Mississippi Delta. Modifications of the "rocking chair" door, which is used in the mud lump area off the Mississippi Delta, and use of mud ropes worked well; and early attempts at "production" fishing were carried out with this rig. Further tests revealed that satisfactory trawl-door performance was obtained by increasing the thickness and width of the steel runners to  $\frac{3}{4}$ " x 6" or 8", and attaching a 4-foot piece of 1" x 4" flatbar to the outside of each door immediately above the runner for additional weight and balance. Apparently, the chief cause of bogging is the "laying down" of a trawl door and the subsequent digging of the forward edge as it is dragged along the bottom. Increasing the weight of the door has an added advantage in that it also permits using shorter warp.

Widely varying weights of catches in adjacent areas have also indicated inconsistent trawl behavior. A simple meter was devised which may be calibrated to give a reading for the distance the trawl is actually working on the bottom (see fig. 4). It consists of an 8" sprocket gear on a shaft attached to a flexible arm

bolted to the runner outside of either trawl door. A bicycle cyclometer is mounted on the top of the arm and is activated by a pin set in the inner surface of the gear. The unit was calibrated on land and checked with loran fixes in test drags. Using

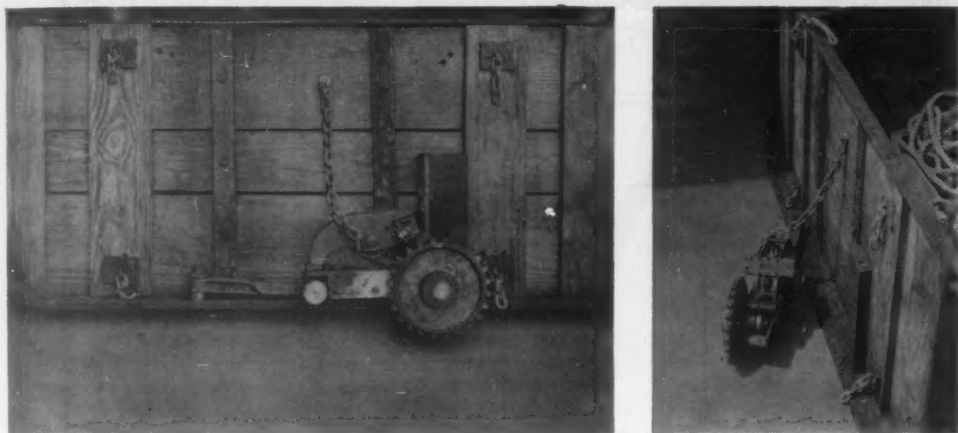


Fig. 4 - Two views of a prototype bottom-distance meter used to determine the actual distance a trawl works the bottom during a drag.

this instrument, it has been possible to obtain an approximate figure of the catch per unit of trawl-working distance. By plotting the readings obtained from a series of drags covering different time intervals, it has also been possible to obtain data on the length of time it takes for the gear to reach the bottom and to start fishing.

Double warps have been used, but a large majority of the drags were made using a single warp and bridle. Galvanized, 6 x 7 performed, improved plow steel, hemp center, marine lubricated wire has proved to be satisfactory construction for trawl warp. Bridles are made of  $\frac{3}{8}$ -inch-diameter wire, with the main warp of  $\frac{1}{2}$ -inch diameter wire.

100-foot flat and 80-foot balloon trawls (also described in FL 394) have been used in "production" trials. Generally speaking, the balloon trawl gave the best performance, particularly off the Mississippi Delta, where a mud rope was needed to keep the flat trawl from bogging.

The 80-foot balloon trawl was used with 8-, 9-, and 10-foot trawl doors, heavily weighted, as were the 5- and 6-foot doors described previously. Widening the runner to 6 inches or 8 inches, shortening the top door chains by one link each, and adding 100 to 150 pounds of iron bar to each door above the runner practically eliminated the bogging problem.

Hauling back of the trawl takes from 25 to 40 minutes, depending on the depth fished. An additional 20 to 25 minutes are needed to dump the catch and re-set the gear. With this amount of fishing time lost per set, it has been found profitable to make long drags, bottom conditions permitting. Drags of 5 or more hours duration are possible since accumulation of bottom trash is moderate.

To effectively fish the deep-water shrimp grounds, the use of loran is imperative. The known fishing areas are bounded on both ends by bad trawling bottom, much of which is not detectable by depth-recording equipment. Also, occasionally small zones of temporarily high concentrations of shrimp will be found, and without the definitive positioning available with loran, it would be extremely difficult to fish them with maximum efficiency.

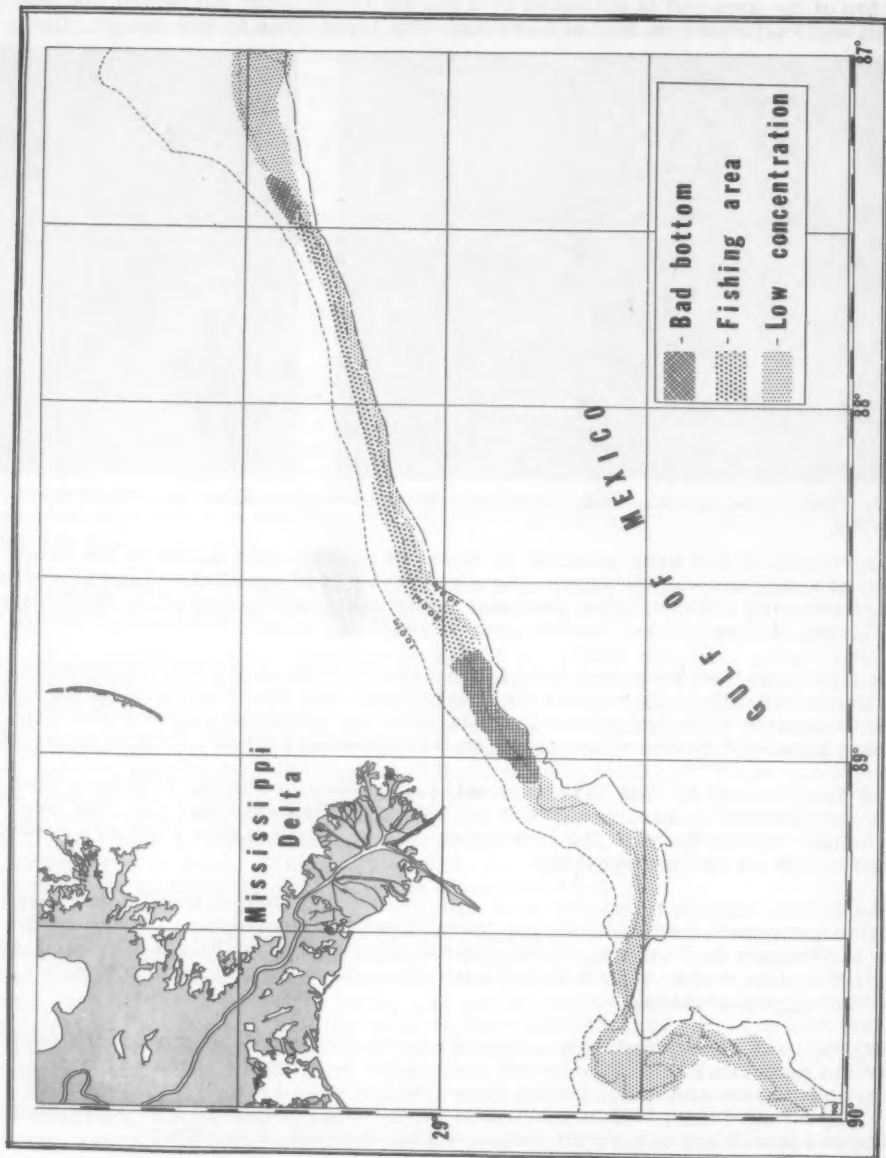


Fig. 5 - Mississippi Delta royal-red shrimp grounds showing areas of fishing concentrations and bad trawling bottom.

### DESCRIPTION OF FISHING GROUNDS AND CATCH DATA FROM COMMERCIAL-SCALE TRAWLING

Royal-red shrimp catches of commercial significance have been restricted, for the most part, to two well-defined areas; off Dry Tortugas, and east of the Mississippi Delta. Although the species is widely distributed, highest catches from all other areas in the Gulf were under 50 pounds of heads-on shrimp an hour. Between March 1955 and June 1956 six cruises were devoted to obtaining commercial-catch estimates in the two areas of promise. The following description of these areas includes a summary of the catch rates obtained.

**MISSISSIPPI DELTA AREA:** These grounds cover an area of approximately 300 square miles, extending from 87° 30' west longitude to 88° 40' west longitude between the 190- and 275-fathom curve. The bottom is cohesive blue mud with very small quantities of sand or shell fragments. The continental slope is moderately pitched, and with the exception of a few "gullies," echograph tracings show no trawling obstructions in the area. Earliest trawling attempts resulted in repeated bogging of trawl doors in the soft mud, which appears to be the principal trawling hazard of the area.

Bottom temperatures at trawling stations have been obtained with a standard reversing thermometer. Close correlation of royal-red shrimp concentrations and bottom temperatures in the Delta area has been noted. With few exceptions, royal-red shrimp appear to be confined within a temperature range of 45°-54° F., which is characteristic of the 190- to 220-fathom range both in the Delta and Tortugas grounds. Largest concentrations have been found in a range of 47° to 52° F., and highest catches have been centered in 47°-50° F. water for both areas. There is strong empirical evidence indicating that the fluctuations in depth-temperature relationships that occur along the continental slope of the northeastern Gulf of Mexico are of primary importance in determining the depth location of fishable concentrations. The shallowest royal-red shrimp record was in a depth of 150 fathoms, at a bottom temperature of 52° F. The usual temperature range at that depth varies from 54° to 58° F. On other occasions temperatures of up to 55° F. have been observed at 200 fathoms. At these times royal-red shrimp apparently move out of the area, and it has been necessary to extend fishing operations down to depths of 240 to 270 fathoms, where temperatures then range between 48°-52° F., to locate maximum concentrations.

There appears to be no seasonal correlation to these occasional depth-temperature changes, and changes in depth of shrimp concentrations. This type of offshore (deeper water) movement of shrimp has been noted in the fall of 1951, in the summer of 1953, in the spring of 1955, and in the summer of 1956. Spring and fall catches in 1950 and catches from early spring through late fall in 1952 showed no variation in optimum depth range and little temperature change.

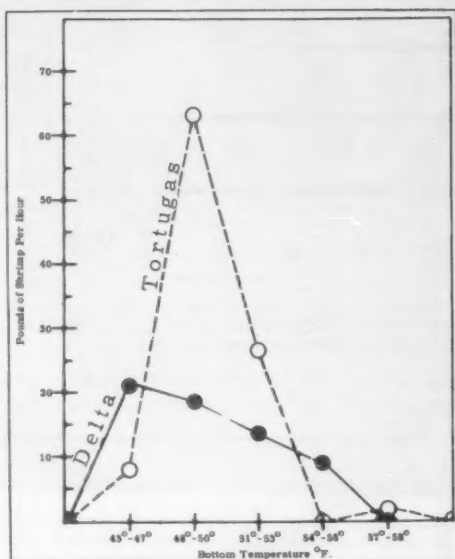


Fig. 6 - Average hourly catches in the Delta and Tortugas areas, at various bottom temperature. Includes data from all successful catches with bottom temperature records, covering all seasons, 1950-1956.



It is probable that the imperfectly known current changes in this area, which may be brought about by a combination of wind and tidal oscillation factors, induce

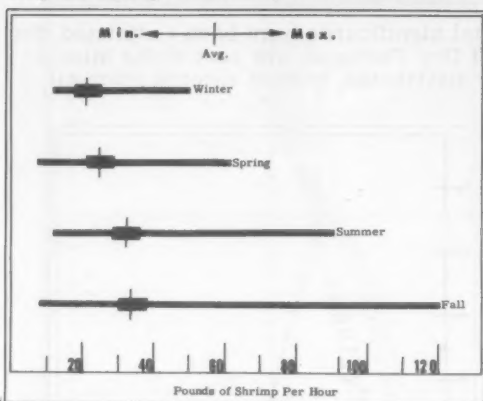


Fig. 7 - Maximum, minimum, and average catch rates for royal-red shrimp in the Mississippi Delta grounds, in depths of 190 to 270 fathoms. Includes data from June 1956.

Seasonal catch rates, based on 80-foot trawl averages, for all successful drags in the 190- to 275-fathom range, are relatively low, but show a gradual increase in rate from a low of 21 pounds (heads-on) an hour in the winter to a high of

irregularly-timed shifting of water masses along the continental shelf and slope, which in turn determines the depths of maximum royal-red shrimp concentrations. It would be profitable for vessels fishing this area to carry a reversing thermometer and a small winch to determine water temperature prior to the start of fishing operations. The use of this equipment could save a considerable amount of time in locating the optimum depth for trawling at the start of a trip, and could provide a periodic check throughout the trip. Trying to locate optimum depths within the vertical range of about 80 fathoms (190 to 270 fathoms) often takes a day or more of test fishing.

Seasonal catch rates, based on 80-foot trawl averages, for all successful

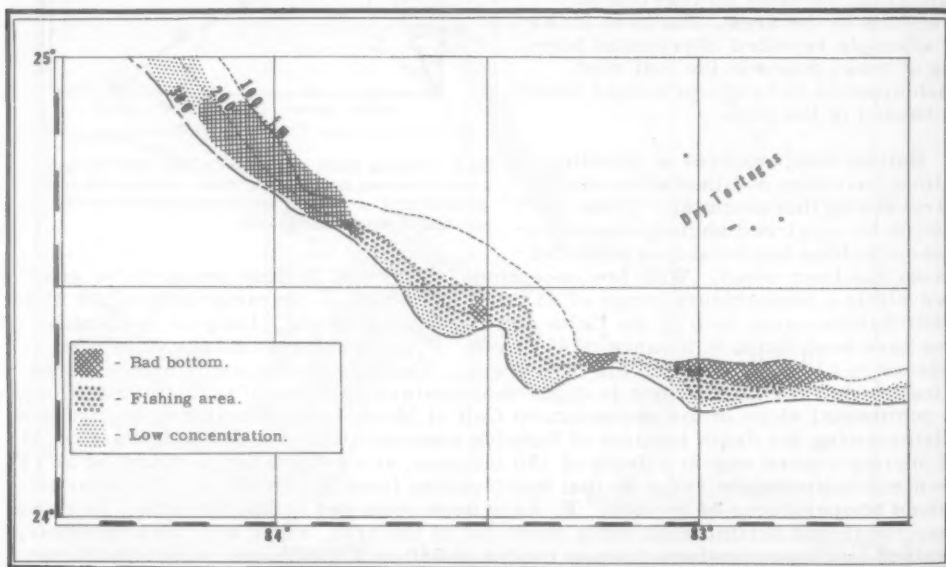


Fig. 8 - Dry Tortugas royal-red shrimp grounds showing areas of fishing concentrations and bad trawling bottom.

36 pounds (heads-on) an hour during the fall. However, these averages include many drags of a purely exploratory nature made outside of the limits of highest known concentrations. The increasing catch rate from winter to fall is shown by the maximum catch rates that have been obtained. In the Delta area, highest winter catches have run approximately 50 pounds heads-on shrimp per hour of dragging. In the spring, the rates increase to 60 pounds of heads-on shrimp an hour. In the summer and fall, maximum catch rates have reached 86 and 120 pounds of heads-on shrimp an hour, respectively.

In limited production trials by the Oregon, high rates have not been reached on a continuing basis. Not infrequent gear failures (i.e., water-hauls, bogging, etc.), particularly during the earlier production trials, resulted in materially reducing daily catch totals. For the winter months these averaged approximately 300 pounds (heads on) a day. For the spring, summer, and fall, catches averaged 600, 700, and 900 pounds a day, respectively. With no apparent change in catch rate between day and night dragging, it is possible to complete approximately four 5-hour tows a day, with an average dragging time of 20 hours a day. Individually good catches by the Oregon indicate a potential round-the-clock catch of 1,000 pounds of heads-on shrimp a day in the winter, to a high of 2,400 pounds a day during the fall.

**TORTUGAS AREA:** These grounds (see fig. 8) cover an area of approximately 120 square miles, extending from  $83^{\circ}17'$  west longitude to  $83^{\circ}45'$  west longitude, between the 190- and 250-fathom curves. The distance between these curves varies from approximately 2 to 6 miles, with an average width of 4 miles. With the exception of a narrow ridge of loose limestone rock along the 212-fathom curve at  $83^{\circ}33.5'$  west longitude, and  $24^{\circ}2.3'$  north latitude (loran reading: 2H6 - 1370; 2H7 - 2955), this entire area provides excellent trawling bottom. The bottom is characterized by a light gray to gray-green calcareous mud. The mud has a fine, gritty texture, and packs hard when allowed to settle in a bucket of water.



Fig. 9 - Separating the royal-red shrimp from a large catch off the Mississippi Delta. Note the proportionately small amount of scrap which is characteristic in good shrimping areas.

At both ends of this area are patches of the hydrocoral, Stylaster, which appear to be impossible to detect on depth recorders because of its low height. Trawls dragged over these patches are invariably torn to shreds. Another smaller trawling area east of the main grounds is centered between  $82^{\circ}40'$  and  $83^{\circ}08'$  west longitude between 190 and 250 fathoms.

Depth contours for the principal fishing grounds form a slight indentation into the continental shelf, which seems to afford some protection from the main current flow of the Gulf Stream. In fact, during trawling operations by the Oregon, a westerly current set of approximately 0.5 knots was observed. Here bottom temperatures have shown little variation in the royal-red shrimp range. Temperatures from April 1954 varied between  $49.1^{\circ}$  and  $52.7^{\circ}$  F. in the 190- to 250-fathom range, with an average temperature of  $50.2^{\circ}$  F. Temperatures from the same area in June 1956 varied from  $48.7^{\circ}$  to  $50.5^{\circ}$  and averaged  $50.0^{\circ}$  F.

Deep-water trawling by the Oregon has been carried out in the Tortugas area in April 1954 (cruise 22), July 1955 (cruise 32), and June 1956 (cruise 39). During the two earlier trips, primary emphasis was placed on delimiting the areas of good catch rates. Although promising catches were made using 40-foot trawls, little success was achieved using larger commercial-scale gear in early trials. On Cruise 22, catches ran from 10 to 120 pounds an hour, and averaged 52 pounds an

hour of heads-on shrimp. Highest catch rates were obtained between 190 and 200 fathoms. On cruise 32, extensive gear damage restricted the amount of work accomplished. Catch rates ran from 8 to 24 pounds an hour using 40-foot trawls, and averaged 13 pounds a hour. Highest catches were made in 200-220 fathoms. Com-



Fig. 10 - One of the potentially valuable byproducts of royal-red shrimp fishing is tasty deep sea red crab (*Geryon quinquedens*) which is occasionally caught in large numbers in 200 to 400 fathoms.

mercial-type dragging on cruise 39 yielded catch rates of from 50 to 196 pounds of heads-on shrimp an hour using 80-foot balloon trawls. Good fishing ranged between 210 and 220 fathoms with highest catches along 212 fathoms. A total of 3,145 pounds of 26-30 count heads-off royal-red shrimp were landed during three days of round-the-clock fishing.

#### DESCRIPTION OF THE CATCHES

Royal-red shrimp have shown no apparent seasonal variation in average size. In areas of maximum fishing concentrations, the heads-off count consistently averaged 26-30, in both the Tortugas and Delta areas. A larger average size is noted in greater depths, but the concentrations are much smaller. No uniform size dominates the catch, which contains individuals ranging from 12- to 50-count heads-off shrimp.

There is some color variation in royal-red shrimp. Nighttime catches are typically bright red, while catches landed during daylight hours are a light pink.

Other species of deep-water shrimp are often found mixed with royal-red shrimp. While dragging in depths of 150 to 225 fathoms, varying quantities of a smaller pink-colored shrimp, *Peneopsis megalops*, have been caught. Average sizes of this species vary from 40 to 60 count heads on. The largest individuals reach approximately 35-count. Highest concentrations of this species in most areas are generally located 10 to 30 fathoms shallower than highest concentrations of *H. robustus*. Incidental catches of *P. megalops* have varied from 10 to over 200 pounds a drag while fishing for royal-red shrimp with large commercial gear. This species has a good flavor and could provide a valuable supplement to royal-red shrimp catches.

Royal-red shrimp catches in the Dry Tortugas area, in addition to *P. megalops*, included from 1 to 45 pounds of large (21-25 count) striped shrimp, *Plesionika longipes*. This species belongs to the family *Pandalidae*, as do the commercial shrimp of northern Europe and of the coasts of Oregon, Washington, and Alaska.

The few drags made beyond the 300-fathom curve have produced small numbers of several other species of large peneid shrimp. Most common of these is the scarlet red *Plesiopenaeus edwardsianus*, which averages about 16-20 count. This species has extremely long swimming legs, and is probably not a bottom dweller.

Another common species throughout the Gulf in 225 fathoms is the hard-shelled *Glyphocrangon longlevi*. Occasionally, catches will contain from 50 to 100

pounds of this species. Although it reaches a fairly large size (31-40 count heads-on) and the meat has a good flavor, considerable work is required to crack the shell and remove the meat. The yield is proportionately small.

Table 1 - Principal Constituents of the Scrap Catch, by Numerical Strength, in the Dry Tortugas and Mississippi Delta Royal-Red Shrimp Grounds

Delta Grounds (85 Tows)		Tortugas Grounds (83 Tows)	
	No. of Fish-- % of Total		No. of Fish-- % of Total
<b>A. Fish (92 percent by weight):</b>		<b>A. Fish (63 percent by weight):</b>	
Macrourids .....	27	Merluccius magnoculus	22
Merluccius magnoculus	26	Chaunax pictus .....	20
Physis cirratus .....	26	Chlorophthalmus chalybicus	16
Bembrops goboides ...	9	Peristedion miniatum ..	8
Peristedion miniatum ..	3	Peristedion gracile ...	7
Scorpaena sp. ....	2	Macrourids .....	5
Other species .....	7	Other species .....	22
	No. of Invertebrates-- % of Total		No. of Invertebrates-- % of Total
<b>B. Invertebrates (8 percent by weight):</b>		<b>B. Invertebrates (27 percent by weight):</b>	
Peneopsis megalops ...	82	Plesionika longipes ...	48
Actinauge longicornis .	5	Munidia sp. ....	20
Sympagurus pictus ....	2	Peneopsis megalops ...	15
Polychaetes sp. ....	1	Tugurium longleyi ....	4
Other species .....	10	Other species .....	13

The identification of some species is still in progress, but to date 87 shrimp or prawn species have been found in the Gulf exploratory catches. All of these could be considered edible, but only about 40 are of sufficient size to be of present commercial value, if found in suitable concentrations.

Accumulation of scrap species has not created much of a problem on long drags. Catches of Gulf whiting (*Merluccius magnoculus*) frequently run from 100 to over 500 pounds a drag, but this species accounts for 25 to 75 percent of the scrap catch, and it is easily handled. The Gulf whiting averages  $\frac{3}{4}$  of a pound and is very similar to the commercially-important Atlantic whiting (*M. bilinearis*). It may eventually prove to be a profitable by-product. A listing of scrap species by approximate numerical strength is presented in table 1.

#### ROYAL-RED SHRIMP ICING TESTS

Yield, quality, and handling studies on *H. robustus* are now being made by the Service's Technological Section and will be reported on separately.



Fig. 11 - Heading a catch of large royal-red shrimp that have been previously separated from the scrap species.

ately.

## CONCLUSIONS

Two areas in the Gulf of Mexico contain sufficient quantities of deep-water royal-red shrimp to permit profitable exploitation throughout most of the year. The magnitude of this potential resource, in terms of continuing yield, is unknown. Although these two areas embrace a total area of several hundred square miles, high concentrations are not found throughout either area at any one time. Therefore, the number of vessels that could sustain profitable production is probably small in relation to the number of large shrimp vessels available for deep-water shrimping, after carrying out winch and rigging modifications.

From preliminary exploratory work along the South Atlantic Coast, it appears promising that additional and more extensive grounds will be available for royal-red shrimp exploitation. This work will be reported on in the near future.

Royal-red shrimp are a very palatable seafood, with a distinctive flavor that cannot be confused with the present commercial species. Preliminary consumer acceptance tests have been tried in selected seafood restaurants, and highly favorable comments have been received on taste, appearance, and texture.

## LITERATURE CITED

- Bullis, Harvey R.  
1951. Gulf of Mexico Shrimp Trawl Designs, Fishery Leaflet 394, U. S. Fish & Wildlife Service, 16 pp.
- Carlson, C. B.  
1953. Shrimp Exploration of the M/V Antillas, Proc. Fifth Annual Session Gulf and Caribbean Fisheries Institute (November 1952), pp. 32-35.
- Schroeder, Wm. C.  
1955. Report on the Results of Exploratory Otter-Trawling Along the Continental Shelf and Slope Between Nova Scotia and Virginia During the Summers of 1952 and 1953. Papers in Marine Biology and Oceanography, Suppl. to vol. 3, Deep-Sea Research, pp. 358-372.
- Springer, Stewart  
1961. The Oregon's Fishery Explorations in the Gulf of Mexico, 1950 (A Preliminary Report). Commercial Fisheries Review, vol. 13, no. 4 (April 1951), pp. 1-8 (also Separate 277).
1955. Exploitation of Deep-Water Shrimp in the Gulf of Mexico, Proc. 7th Annual Session Gulf and Caribbean Fisheries Institute (1955), pp. 67-71.
- Springer, Stewart and Bullis, Harvey R.  
1952. Exploratory Shrimp Fishing in the Gulf of Mexico, 1950-51, Fishery Leaflet 406, U. S. Fish and Wildlife Service, 34 pp.
1954. Exploratory Shrimp Fishing in the Gulf of Mexico, Summary Report for 1952-54, Commercial Fisheries Review, vol. 16, no. 10 (October), pp. 1-16 (also Separate 380).





# IRON SULFIDE DISCOLORATION OF TUNA CANS<sup>1/</sup>

## No. 4 - Effect of Retorting and Cooling Canned Fish

By George M. Pigott\* and M. E. Stansby\*\*

### ABSTRACT

Investigations were made on the effects of retorting and cooling on the formation of black ferrous sulfide discoloration in canned tuna. Free sulfide was not found in the unprocessed fish but appeared in all canned tuna after processing. The amount of free sulfide was found to increase with longer retorting periods. Free sulfide did not form a black precipitate of ferrous sulfide unless the free iron in the ferrous state was available. Discoloration occurred in the cans during the cooling period and was greater in cans held, while cooling, at elevated temperatures.

### INTRODUCTION

Certain batches of tuna when canned cause an iron sulfide deposit to form on the can area adjacent to the headspace. The deposit is caused by a reaction between sulfide from the fish and iron in the can. This paper is the fourth in a series of six papers in which a study of the reaction between ferrous iron in tuna cans and sulfide in tuna meat is reported (Pigott and Stansby 1955).

Previous work showed that precooked tuna contains no free sulfide. Therefore, the sulfide in the canned product that is available for reacting with iron must be produced during retorting. Any discoloration formed could also be materially affected by the conditions of time and temperature under which the cans are cooled. The object of this paper is to report experimental work on the effect of retorting and cooling on the sulfide content, and subsequent discoloration, of canned tuna.

### RETORTING CANNED TUNA

If the amount of discoloration in canned tuna depends on the amount of sulfide present and the amount of sulfide produced is dependent on the length of the retorting period, a slight variation in the cooking time might be the deciding factor in can discoloration. In order to investigate the formation of sulfide as a function of retorting time, local albacore tuna that had been in cold storage at -20° F. for 10 months was canned and retorted at 240° F. for various periods of time up to 6 hours. The headspace gases and meat (including liquid) in composites containing 5 cans each were then analyzed for sulfide content. The precooked fish contained no free sulfide when placed into the cans.

The sulfide content became appreciably larger in amount as the retorting time was increased. The results (fig. 1) showed that the free sulfide formed during

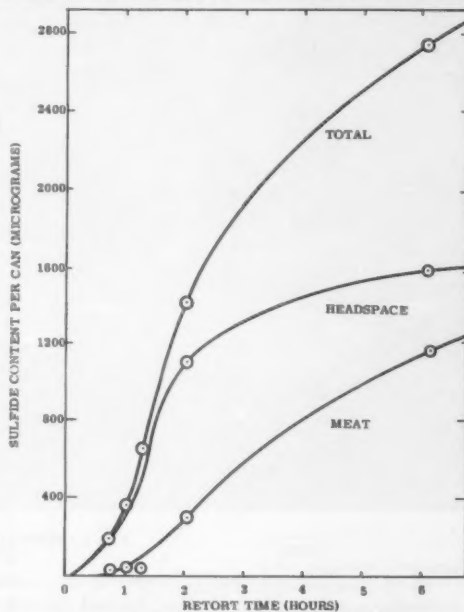


Fig. 1 - Sulfide content of can vs. retort time.

\* Formerly Chemical Engineer, Continental Can Company, Seattle, Wash.

\*\* Chief, Pacific Coast and Alaska Technological Research, Fishery Technological Laboratory, Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Seattle, Wash.

<sup>1/</sup> This investigation, which was carried out at the Seattle Technological Laboratory, U. S. Fish and Wildlife Service, was jointly sponsored by the Continental Can Company and the Fish and Wildlife Service.

retorting was found mostly as hydrogen sulfide gas in the headspace of the can, although significant amounts were found in the meat. Tin sulfide staining was found in cans that were processed one hour, and this staining also became larger in amount with increased retorting time. However, even though the sulfide content of the cans became far greater than that found in normal packs, no ferrous sulfide discoloration was formed in this particular batch of tuna.

The above results showed that sulfide in canned tuna is released during the retorting period (fig. 2). A series of analyses were carried out to determine the



Fig. 2 - Retorting of canned tuna.

amount of sulfide normally present in canned tuna. Analyses for sulfide were run on commercially-canned discolored packs and on experimentally-canned tuna packs. The commercially-packed discolored cans were samples from 3 packs that had been rejected for consumer distribution because of this discoloration. The amount of sulfide that was deposited on the can was determined by dissolving the deposit in hydrochloric acid and then removing hydrogen sulfide in the regular manner by aeration.

It was found that appreciable sulfide is present in both normal and discolored tuna cans. The distribution of sulfide in various packs is shown in table 1. Experimental pack 1 is from the same experiment in which the amount of sulfide formed during retorting was determined. An exploration for the hydrogen sulfide being much higher in this pack is that the fish used were from the group of local albacore that were slightly spoiled when frozen and hence the fish tissue was more easily broken down by thermal processing.

Sulfide was added to experimental packs in quantities varying from 100 micrograms to 1 gram. Even when 1 gram of sodium sulfide was added--as shown in

Table 1 - Distribution of Sulfide in Various Packs of Tuna

Table 1 - Distribution of Sulfide in Various Packs of Tuna									
Packs From Which the Cans Were Obtained				Sulfide Deposited on Can <sup>1/</sup>		Sulfide Still Available in Can (as H <sub>2</sub> S) <sup>1/</sup>			Total Sulfide in Can
Designation of Pack		Species of Tuna	Type of Pack	Amount Deposited (as H <sub>2</sub> S)	Degree of Discoloration	Amount in Meat, Including Liquid	Amount in Headspace Gas	Total Amount	
Type	Lot								
	No.			Micrograms per Can <sup>2/</sup>		(Micrograms Per Can <sup>2/</sup> )			
Commercial	1	Yellowfin	Flake	Trace	Slight	18	38	56	56
	2	Yellowfin	Solid	55	Moderate	29	15	44	99
	3	Albacore	Solid	30	Moderate	57	64	121	151
Experimental	1	Albacore	Solid	0	None	66	582	648	648
	2	Albacore	Solid	0	None	24	104	128	128
	3	Yellowfin	Solid	0	None	15	101	116	116
	4	Albacore	Solid	0	None	-	-	-	3/10 <sup>6</sup>
	5	Albacore	Solid	0	None	-	-	-	5/10 <sup>6</sup>

<sup>1/</sup>The values given are the averages obtained in the examination of 48 cans or more from each pack, except for Commercial Pack No. 1 from which 12 cans were examined, 2/Size 307 x 113, one-half pound tuna can.

<sup>2/</sup>0.004% sulfidic acid added on meat. 3 Few drops of dilute H<sub>2</sub>O<sub>2</sub> were added to liquid 100 ml.

<sup>3/</sup>Sulfide artificially added as Na<sub>2</sub>S.

<sup>1/</sup>The values given are the averages obtained in the examination of 48 cans or more from each pack, except for Commercial Pack No. 1 from which 12 cans were examined.

<sup>2/</sup>Size 307 x 113, one-half pound tuna can.

<sup>3/</sup>Sulfide artificially added as Na<sub>2</sub>S. A few drops of dilute HCl were added to insure liberation of H<sub>2</sub>S.

table 1, experimental lots 4 and 5--iron sulfide did not form. However, when ferrous salts were suspended in water and painted on the lids used in the experimental packs, extensive deposits of ferrous sulfide formed in all experimental packs after retorting. Thus, it is the presence of ferrous iron and not the amount of sulfide that is the controlling factor in can discoloration.

#### COOLING CANS AFTER RETORTING

A series of experiments were carried out to determine when discoloration actually takes place in canned tuna. Albacore and yellowfin from batches of tuna that had a history of causing can discoloration were packed and retorted for 75 minutes at  $240^{\circ} \pm 2^{\circ}$  F. The pack, which was allowed to cool at room temperature, was sampled at time intervals up to 24 hours. The sampled cans were opened and the area of sulfide discoloration was measured. In all cases, no discoloration was found immediately after the cans were retorted. The first specks of iron sulfide were detected after about 1 hour and continued to grow in size and number until about 10 hours after the retorting period. In all cases the maximum discoloration was reached before 24 hours after retorting. The results of this experiment are shown in figure 3.

An investigation of the effect of various cooling temperatures was carried out using yellowfin tuna from the above experiments. Albacore tuna that had shown no history of can discoloration was also used. Immediately after the retorting period the canned fish were placed in constant-temperature oil baths ranging from 64° F. to 216° F., for a period of 21 hours. After removal from the baths, the cans were placed at room temperature storage. Upon inspection of the cans "cooled" at the various temperatures, can discoloration was found to be at a maximum after the 21-hour period. Iron sulfide discoloration was found in cans of

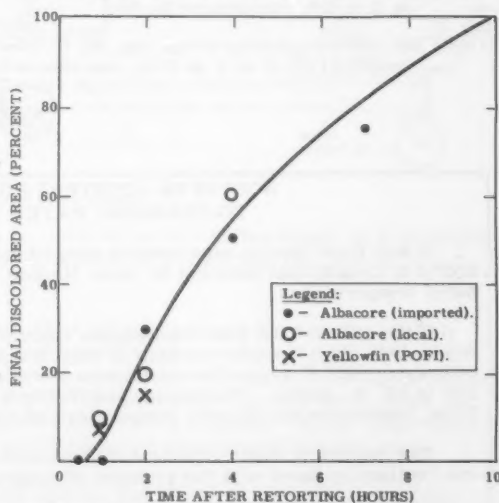


Fig. 3 - Development of can discoloration after retorting.

both the yellowfin and albacore that were held at temperatures above 135° F. In all cases, can discoloration became progressively worse with increased cooling temperatures.

### CONCLUSIONS

- (1) Formation of black iron sulfide in canned tuna was found to depend upon the presence of ferrous iron.
- (2) All cans of tuna contained sufficient hydrogen sulfide to give can discoloration if any exposed iron in the can was in the form.
- (3) Sulfide discoloration occurred after the cans were retorted, during the cooling period.
- (4) Sulfide discoloration in packs that commonly showed the discoloration was made much worse if the cans were allowed to remain at elevated temperatures while cooling.
- (5) The free sulfide formed during retorting was found mostly as hydrogen sulfide gas in the headspace of the can, although significant amounts were found in the meat.

Note: Also see *Commercial Fisheries Review*, Oct. 1955, p. 33, for "Background" and "No. 1 - Theory of Iron Sulfide Formation in Cans;" Feb. 1956, p. 5, for "No. 2 - Analytical Methods;" June 1956, p. 8, for "No. 3 - Effect of Variables Introduced by the Fish."

### LITERATURE CITED

Pigott, George M., and Stansby, Maurice E.

1955. Iron Sulfide Discoloration of Tuna Cans. No. 1 - Theory of Iron Sulfide Formation in Cans. *Commercial Fisheries Review*, vol. 17, No. 10, pp. 34-39. (Also Separate No. 418.)

1956a. Iron Sulfide Discoloration of Tuna Cans. No. 2 - Analytical Methods. *Commercial Fisheries Review*, vol. 18, no. 2, pp. 5-9. (Also Separate No. 429.)

1956b. Iron Sulfide Discoloration of Tuna Cans. No. 3 - Effect of Variables Introduced by the Fish. *Commercial Fisheries Review*, vol. 18, no. 6, pp. 8-12. (Also Separate No. 439.)



### NORTHERN LOBSTERS ADJUST THEMSELVES TO CHANGING WATER TEMPERATURE

It was found during experiments conducted by scientists of the Fisheries Research Board of Canada that lobsters do have limited ability to adjust themselves to changing water temperatures.

If the salt and the dissolved oxygen content of the water are favorable, the lobsters can be held alive for several days at high temperatures. Those lobsters acclimated to cold water (40° F.), can live in water as warm as 75° F.; those used to 80° F. water can live in 90° F. water. But they can be killed by a sudden lowering of the water temperature. Thus, lobsters held at as low a temperature as 60° F. died when placed in water of 40° F.

The results of these experiments have been of great value to commercial interests who are continually faced with the problem of holding lobsters alive for shipment to markets.

In the waters where the lobster (*Homarus americanus*) is found, the temperature range is about 45° F., from 30° F. in winter to 75° F. in certain areas during the summer months.

--Sea Secrets, The Marine Laboratory,  
University of Miami, Coral Gables, Fla.

## PILOT-PLANT FISH-MEAL DRYER

By Lynne G. McKee\* and Neva L. Karrick\*\*

### PREFATORY ABSTRACT

This article reports on the design and method of construction of an experimental fish-meal dryer. The device is compact, portable, and makes possible close control of the various processing variables. From 2.5 to 10 pounds of meal can be prepared in the dryer at one time. It has been found satisfactory for processing both tuna viscera and whole herring.

### INTRODUCTION

The development of laboratory methods to determine the relative nutritional quality of fish meals is one of the important projects in the Service's Branch of Commercial Fisheries. Before such methods can be developed, however, the factors causing the differences in quality must be known. Knowledge of these factors

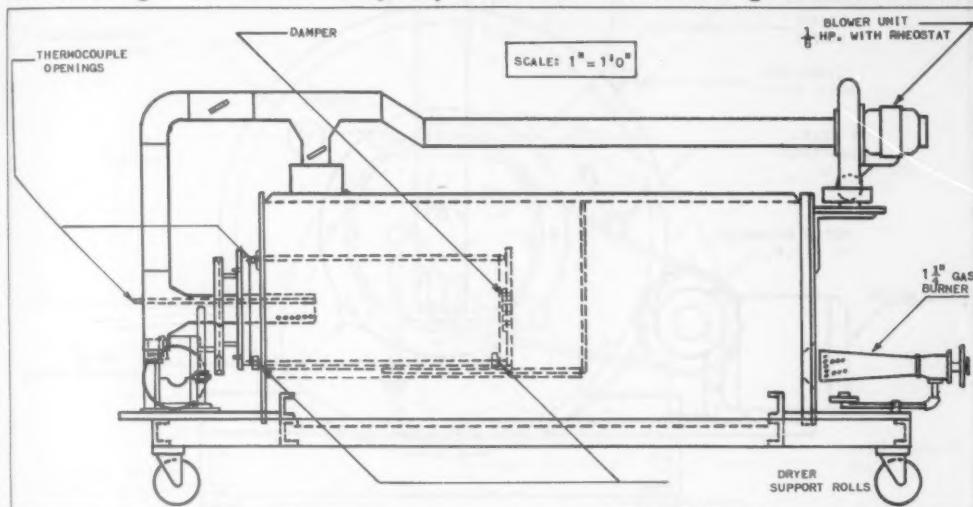


Fig. 1 - Side view of dryer housing.

then can be applied to setting up methods to determine the differences in a quantitative manner and, ultimately, to solving the problem of producing fish meal of uniform quality.

In order that the processing variables that affect the nutritive value of fish meal could be studied, a pilot plant-scale fish-meal dryer was designed and constructed. This dryer was designed in such a manner that the operator would have complete knowledge of the conditions inside of the dryer during different steps of the drying process and would be able to control these conditions. Runs thus could be repeated exactly, and variables could be introduced and controlled exactly.

For convenience and for use in limited space, the meal dryer had to be compact and portable. It had to be a complete unit, with gas and electrical connections being the only separate components needed; and it had to be large enough to hold the amount of raw material necessary to produce  $2\frac{1}{2}$  to 10 pounds of meal, which is about the amount that ordinarily is needed to check the nutritional value of the meal by chemical and biological tests.

\*Fishery Products Technologist  
\*\*Chemist

{ Fishery Technological Laboratory, Branch of Commercial Fisheries,  
U. S. Fish and Wildlife Service, Seattle, Wash.



## DESCRIPTION OF PILOT-PLANT FISH-MEAL DRYER

The essential parts of the fish-meal dryer are as follows: (1) a rotating inner drum with parallel flights (vanes) to distribute and tumble the meal while it is drying; (2) a stationary drum or housing to confine and direct the hot gasses around the rotating drum; (3) a nozzle-type gas-burner heat source; and (4) accessories--

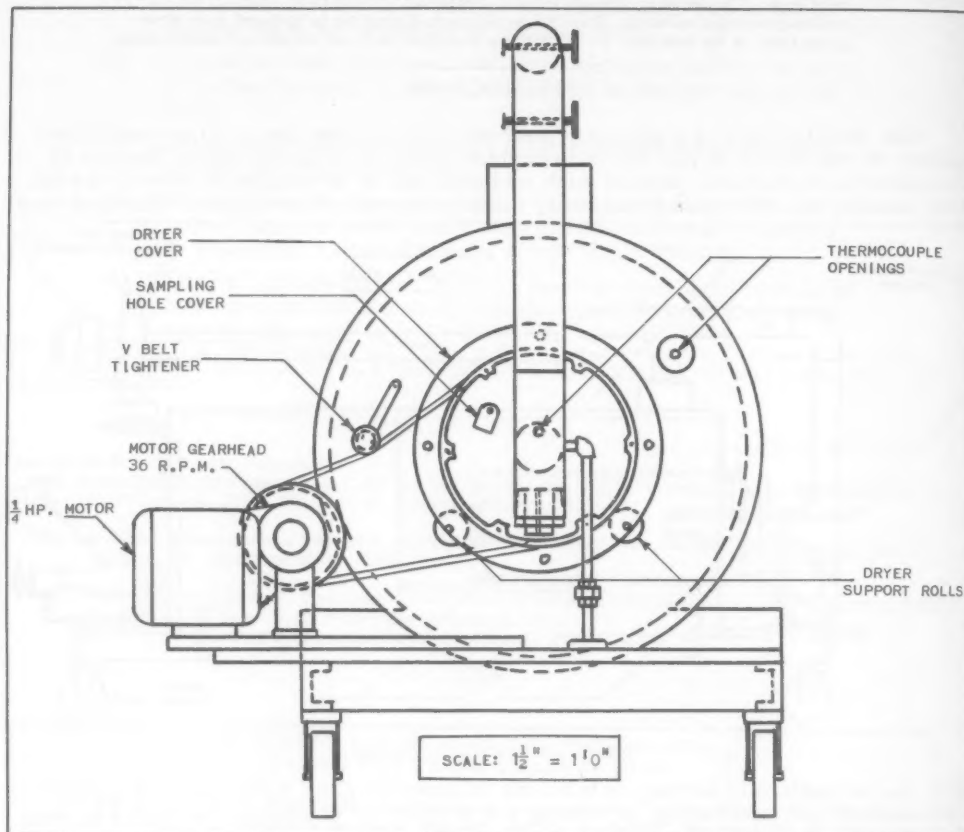


Fig. 2 - Front view of dryer housing.

drum motor, exhaust fan, thermocouples, and air ducts. Because the exact conditions used to dry the meal must be known, it was necessary to have knowledge and control of (1) the gas-air combination needed to obtain particular heating conditions, (2) the temperatures in the jacket and in the drum, (3) the regulation of the draft, and (4) the speed of rotation of the drum.

The housing of the dryer (fig. 1) was rolled from 10-gauge black sheet steel into a cylinder 24 inches in diameter and 60 inches in length. The rotating drum (the inner cylinder) was rolled from the same material and was 12 inches in diameter and 30 inches in length. All end plates and baffles were cut from the 10-gauge black sheet steel. (A lighter gauge would warp under the heat, and the inner cylinder would be distorted sufficiently to interfere with rotation; a heavier gauge would be harder to work and would make the assembly unduly heavy.) The circular disks used for end plates were cut 2 inches larger in diameter than were the respective

cylinder diameters in order to make it possible to attach the end plates to the cylinders with lugs and stove bolts. On the smaller cylinder, an iron ring made from 1-inch by 1-inch by  $\frac{1}{8}$ -inch angle iron was pressed over the ends of the cylinder, and the end plates were secured to these rings. Angle-iron lugs were welded, at intervals, to the edge of the large cylinder, and the end plates were bolted to the lugs.

The assembly (fig. 2) was mounted upon a 3-inch channel-iron frame, which was 24 inches by 84 inches and was fitted with 4-inch rubber-tired casters at the corners. The 24-inch cylinder was mounted on saddle blocks cut from 3-inch

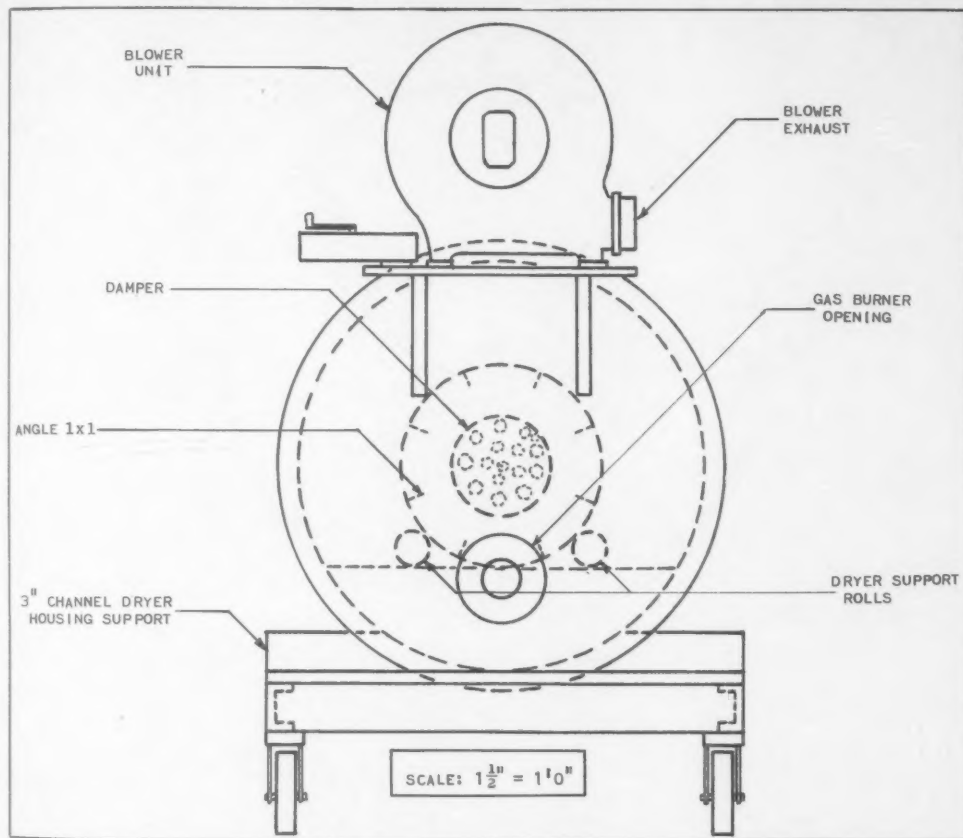


Fig. 3 - Rear view of dryer housing.

channel iron and was placed across each end of the channel-iron frame. Blocks of 85-percent magnesia were used to insulate the sides and rear of the dryer. (The front end plate was not insulated because the free space on it was too limited for the use of insulation to be practical.) The insulating blocks were covered with cotton duck in the usual manner, and the entire assembly was painted with heat-resistant aluminum paint.

The front end of the rotating drum was supported by two rollers attached to the front end plate of the housing of the dryer. The rear end of the rotating drum was

supported by two rollers on the interior of the housing (fig. 3) and was attached to an angle-iron frame welded to the inner surface of the housing. Lubrication was supplied to the rear rollers by means of two  $\frac{1}{4}$ -inch copper tubes extending through the front housing.

A 12-inch V-pulley was attached to the front cover plate to drive the rotating drum. In order that the middle area of the cover could be left free for other attachments, the hub and spokes of the V-pulley were cut away, and only short lugs

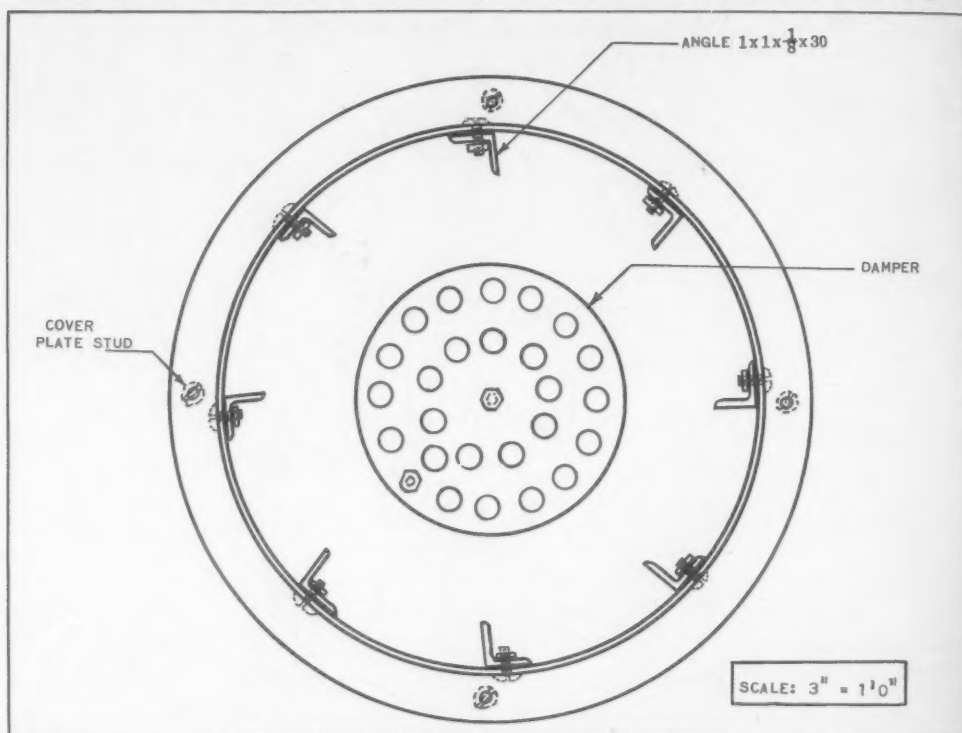


Fig. 4 - Front view of rotary drum.

were left at the rim (fig. 2 and 5). These lugs were drilled, and stove bolts were passed through the resulting holes to bolt the pulley to the cover. Pipe nipples  $\frac{1}{4}$  inch by 2 inches were slipped over the stove bolts to hold the pulley away from the cover (fig. 7) and to minimize the conduction of heat to the V-belt. A  $\frac{1}{4}$ -horsepower gear-head motor having a take-off speed of 36 revolutions per minute was used to provide power for rotating the drum at a speed of 12 revolutions per minute. An adjustable tightener was used to take up the slack in the V-belt.

The cover plate was attached to the rotating drum by means of four  $\frac{1}{4}$ -inch studs spaced equidistant around the periphery of the drum. Wing nuts were used on the studs to permit the cover plate to be removed quickly. Parallel flights were attached to the inner surface of the drum (fig. 4) to distribute the meal while it is drying. These flights consist of 8 angle-iron sections that are  $\frac{1}{4}$  inch by 1 inch by 1 inch and that are 30 inches in length. The flights were bolted to the under surface of the drum, parallel to its longer axis. The dryer was constructed level so that the meal will not gravitate to one end of the drum when it is rotating.

A damper that is 6 inches in diameter was placed on the rear end plate of the rotating drum to provide for the circulation of air through the drum. Holes  $\frac{1}{2}$  inch in diameter were drilled through the damper and the end plate to provide entrance for hot gases to the drum. The circulation of air can be adjusted by the damper. The drying process thus can be made wholly indirect or can be made semiindirect.

A motor-driven fan blower was mounted on the top of the rear end of the housing (fig. 3) to insure a draft through the dryer. A 3-inch stovepipe duct was connected to the exhaust side of the fan and was vented through a hole in a window to the outside air (fig. 6). Another 3-inch stovepipe duct was connected from the intake side of the fan to the forward end of the housing, where it entered a 3-inch tee connected with the interior of the housing. The duct to the rotating drum was led downward and into the front end of the drum through the center of the removable cover. Dampers were placed in each branch of the duct to provide independent control of the draft through the drum and the housing. The air ducts were made easily detachable. A  $\frac{3}{8}$ -inch pipe support was attached to the horizontal duct entering the drum in order to prevent the vibration of the drum from shaking the air duct loose from the elbow or from the tee. A union at the lower end of the support was adjusted finger tight in order that it could be detached quickly. The horizontal duct was projected into the rotating drum about 6 inches, and the end of the vertical duct was closed with a wooden plug. A series of  $\frac{1}{2}$ -inch holes were drilled in the lower side of the portion of the horizontal duct projecting into the rotary drum in order that the fines falling downward would not accumulate in the end of the duct. During the drying process, moisture condenses within the vertical riser of the exposed air duct. A small hole therefore was provided in the plug closing the 3-inch tee to allow this condensed moisture to escape.



Fig. 5 - General view of laboratory-scale flame dryer. Note the motor and the drive mechanism for rotating the inner meal-containing cylinder and note also the exhaust pipes and the blower at the top. The dial-type instrument records, by means of thermocouples, the temperatures obtained within the dryer.

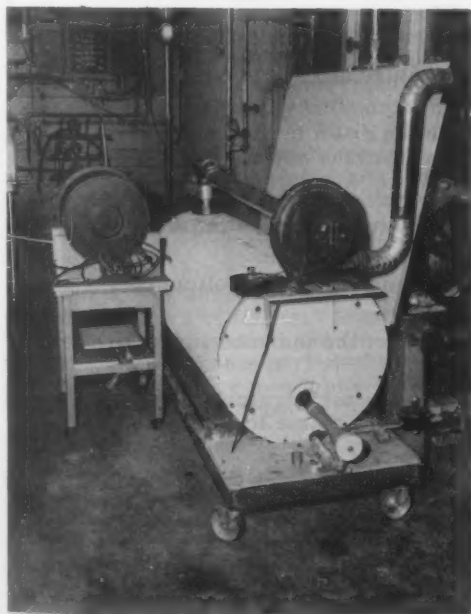


Fig. 6 - Rear view of the laboratory-scale flame dryer. Note the gas burner (near the bottom) and the blower for the discharge of gases at the top of the dryer.

A  $1\frac{1}{4}$ -inch gas burner with a  $\frac{3}{4}$  inch inlet to the city gas main was used for the source of heat. An indexed dial

was mounted on the stem of the needle valve of the burner to enable the valve settings to be repeated for replicate runs. The rheostat on the fan blower and the handles of

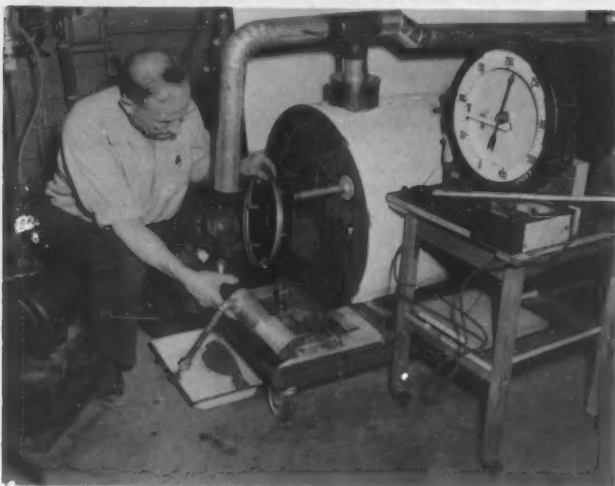


Fig. 7 - Opening the dryer preliminary to removal of the meal.

the dampers also were indexed to allow reproducible control for replicate runs. One thermocouple was inserted into the housing space of the dryer, adjacent to the rotating drum, through a  $\frac{1}{2}$ -inch by 4-inch pipe nipple in the front end plate. A second thermocouple was inserted into the rotating drum itself by means of a  $\frac{1}{2}$ -inch tube that passes through the horizontal duct and enters the center of the drum.

The completed dryer is shown in figures 5 and 6. Figure 5 shows the front of the dryer, with the thermocouples, the air ducts to the rotating drum and jacket, the V-belt connection to rotate the drum, and the front cov-

er. Figure 6 shows the rear of the dryer, with the gas burner, the fan blower, and the exhaust.

#### OPERATION OF THE DRYER

The dryer is operated as follows:

1. Preheat the dryer until the temperature of the combustion space is about 280° F.
2. Remove the air duct from the rotating drum by loosening the finger-tight union and pulling the duct free from the upper elbow.
3. Slacken the V-belt tightener and run the V-belt off the pulley.
4. Remove the four wing nuts from the studs and take off the cover (fig. 7).
5. Distribute pulverized press cake evenly along the bottom of the drum by means of a scoop.
6. Reassemble the cover and ducts, insert the thermocouples, and start rotating the drum.
7. Since the cold press cake will cause the temperature of the dryer to drop sharply, advance the setting of the gas flame to compensate for this drop.
8. When the dryer is at the correct temperature, which will be reached after about 10 minutes of operation, decrease the flame gradually to the point where an even temperature is maintained as the moisture is evaporated from the press cake.
9. As the press cake dries, cut the flame down gradually to prevent the resulting meal from being scorched. By the end of the run, the burner should be almost closed.



If the speed of the fan is too high, meal fines will be drawn into the horizontal duct and will settle in the lower end of the tee above the plug on the vertical riser of the air duct. Upon the completion of the run, this meal can be recovered by removing the plug at the bottom of the tee. The fan motor should be run at a speed that will maintain a great enough draft for efficient drying but that will not result in the collection of an excessive amount of fines from the rotating drum.

This pilot-plant fish-meal dryer has been operated satisfactorily both with tuna viscera and with whole herring as the raw material. Minor adjustments in operational details are necessary when the raw material is changed. When a precooked material of a light density or small particle size is used, for example, the velocity of the air in the exhaust system must be modified in order to insure that fines are not carried out of the inner drum. The meal does not stick to the side of the drum, indicating that there is adequate tumbling action. The temperature can be varied, and that selected can be maintained closely. In initial tests,  $2\frac{1}{2}$ - to 10-pound batches of meal were dried in 1 to 2 hours at a jacket temperature of  $225^{\circ}$  to  $300^{\circ}$  F.

#### ACKNOWLEDGMENT

The authors gratefully acknowledge the aid of Richard W. Nelson, who drew figures 1 to 4.



#### SEA GETTING WARMER

During the last two or three decades an increase in the temperature of the surface waters of the Atlantic Ocean has been demonstrated. At the sources of the Gulf Stream this rise is less than one degree Centigrade, but further north two-degree increases have been recorded. This rise is not confined to the surface waters entirely, but may extend down to depths of over 100 fathoms.

The warmer temperatures in recent years have decreased the area covered by floating ice in the Arctic, and the thickness of this ice is now reduced some 40 percent. This is important to navigation in opening up new areas and increasing the period of time that vessels may operate in the northern waters.

Owing to this rise in water temperatures the fisheries of the north have also benefited. Extensive banks, formerly too cold, have been made habitable for several species of fishes. Notable among these is cod, which has extended itself in the waters of Iceland and Greenland, and the catch of cod from these waters has increased during this period of higher temperature. Much of this increased production reaches our own tables in the form of frozen fish sticks made from frozen fillet blocks and as frozen fillets.

--Sea Secrets, The Marine Laboratory,  
University of Miami, Coral Gables, Fla.



# RESEARCH

## IN SERVICE LABORATORIES



### VARIATION IN PROXIMATE COMPOSITION OF RIGHT AND LEFT FILLETS OF ROCKFISH (*SEBASTODES PINNIGER*) AND DOVER SOLE (*MICROSTOMUS PACIFICUS*)

#### ABSTRACT

Individual proximate analyses were made on right and left fillets of 10 rockfish and 10 dover sole. No significant differences were found in the moisture, oil, and protein composition of the right and the left fillets from these 20 individual fish.

#### BACKGROUND

A sample for studies on proximate composition usually is prepared from the entire edible portion of a fish. This procedure insures a representative sample of that fish. Such samples, however, are expensive. If the same results could be obtained with one fillet, the cost of the sample, of course, would be cut in half. If the

whole fish was bought, the second fillet could be used for other studies.



Fig. 1 - Titration for nitrogen determination.

Paired fillets often are used in technological studies, such as freezing, storage, and taste tests. If the fillets are known to be identical--especially in oil content--greater reliance can be placed upon the results. Studies on differences between the paired fillets--or the lack of differences--are being conducted over a period of time. Thus the Oregon Seafoods Laboratory, under an arrangement with the U. S. Fish and Wildlife Service, has analyzed paired fillets of two species to obtain the results reported in this paper.

#### SAMPLES AND PROCEDURE

The species of fish used in these tests were rockfish and dover sole. The rockfish were chosen as an example of a symmetrical fish of low-oil content, whereas

the dover sole were chosen as an example of an unsymmetrical fish of low-oil content. The particular fish used in these tests were caught off the coast of Oregon and were landed at Astoria in a strictly fresh condition. Ten fish of each species were filleted. The individual fillets were analyzed for their moisture, oil, and protein contents by procedures described by the American Association of Official Agricultural Chemists (1950).

## RESULTS AND DISCUSSION

Results on the right and the left fillets of the rockfish are reported in table 1. Results on the right and left fillets of the dover sole are reported in table 2. The right fillet of dover sole is the top or dark side; the left fillet is the bottom or light side.



Fig. 2 - Weighing fish samples for the determination of moisture.

The composition of the rockfish fillets was typical of a non-oily fish. Averages of the moisture, oil, and protein values were the same for both the right and the left fillets of the fish.

Table 1 - Proximate Composition of Right and Left Fillets of 10 Rockfish (*Sebastes pinniger*)

Data on Whole Fish				Proximate Composition of Right & Left Fillets					
Fish Sample	Length	Weight	Sex	Moisture		Oil		Protein	
				Right	Left	Right	Left	Right	Left
No.	Mm.	Gm.		(Percent)					
1	502	1951	F	79.3	79.4	1.28	1.24	19.1	19.0
2	513	1909	F	79.2	79.2	0.94	0.94	18.7	18.8
3	519	2050	F	79.7	79.6	1.05	1.10	18.6	16.6
4	527	2014	F	78.9	78.8	1.10	0.92	19.3	19.0
5	472	1519	M	78.6	78.5	1.34	1.35	19.3	19.5
6	475	1728	M	78.2	78.4	1.72	1.83	19.4	19.2
7	509	1965	M	79.1	79.3	1.04	0.93	18.8	18.7
8	512	1779	M	79.9	79.7	0.88	0.90	18.3	18.2
9	531	2073	M	79.5	79.7	1.00	0.95	18.5	18.5
10	541	2270	M	80.9	80.8	0.60	0.65	17.8	17.8
Avg.	510	1926	-	79.3	79.3	1.10	1.09	18.8	18.7

The dover sole fillets had high moisture, low oil, and low protein contents. Samples 3 and 10 should be noted because they had a "jellied" condition similar to that described by Templeman and Andrews (1956) for the American plaice (*Hippoglossoides platessoides* Fabricus). Fish in this condition are not marketable, and fishermen attempt to avoid areas where they are found. Sample 3 is unusual in that it contained 90 percent moisture and only 8.6 percent protein.

In none of these fish were differences of a magnitude to interfere with results of experiments using paired fillets. Statistical analyses of the differences between

Table 2 - Proximate Composition of Right and Left Fillets of 10 Dover  
(*Microstomus pacificus*)

Data on Whole Fish				Proximate Composition of Right & Left Fillets					
Fish Sample	Length	Weight	Sex	Moisture		Oil		Protein	
				Right	Left	Right	Left	Right	Left
No.	Mm.	Gm.		(Percent)					
1	339	362	F	82.1	82.5	0.95	0.87	16.4	15.9
2	430	759	F	82.9	83.0	0.69	0.65	15.7	15.4
3 1/	458	808	F	89.4	90.5	0.34	0.31	8.9	8.3
4	478	1107	F	83.5	84.4	0.73	0.64	14.3	14.0
5	488	1025	F	82.5	83.7	0.60	0.59	15.5	14.8
6	355	408	M	83.6	83.5	0.74	0.68	14.8	15.0
7	385	543	M	85.0	85.3	0.68	0.57	13.5	13.3
8	413	686	M	84.9	83.8	0.71	0.79	13.5	14.0
9	415	714	M	84.1	84.2	0.57	0.52	14.4	14.6
10 1/	438	784	M	84.5	84.8	0.54	0.63	13.6	12.8
Avg.	420	720	-	84.3	84.6	0.66	0.63	14.1	13.8

1/These fish had a "jellied" condition that made them unsuitable for marketing.

right and left fillets of both species showed what visual observation of the results indicated--that no significant differences in moisture, oil, or protein existed between the right and the left fillets of either species.

## LITERATURE CITED

## Association of Official Agriculture Chemists

1950. Official Methods of Analysis. Seventh edition, Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington 4, D. C., pp. 296-297; 346.

## Templeman, Wilfred, and Andrews, Gertrude L.

1956. Jellied Condition in the American Plaice *Hippoglossoides platessoides* (Fabricus). Journal of the Fisheries Research Board of Canada, vol. 13, no. 2, March, pp. 147-182.

--R. O. SINNHUBER, ASSOCIATE BIOCHEMIST,  
T. C. YU, RESEARCH ASSISTANT,  
TE CHANG YU, CHEMIST

{ SEAFOODS LABORATORY, FOOD  
TECHNOLOGY DEPARTMENT, OREGON  
STATE COLLEGE, ASTORIA, ORE.

N. L. KARRICK, CHEMIST,  
FISHERY TECHNOLOGICAL LABORATORY,  
BRANCH OF COMMERCIAL FISHERIES,  
U. S. FISH AND WILDLIFE SERVICE, SEATTLE, WASH.



## FISH COMPOSITION STUDIES

There are approximately 200 species of fish and 40 species of shellfish taken for food and appearing on the United States dinner tables. These fish vary in protein, fat, or ash content, but all have a low level of carbohydrate content. Modern diets based on balanced nutritive values as well as appetite appeal, require knowledge of the chemical composition of the foods involved. Diets containing fish are no exception, and to attain this knowledge the U. S. Fish and Wildlife Service has instituted a continuing study of the protein, fat, mineral, and vitamin content of all species of fish taken for food. The relative amounts of these various components may vary with the species of subspecies, geographical area of capture, sex, season of the year and, to some extent, with the individual fish. The data serve also as a means of determining the probable frozen storage life of the processed fish, commercial yield after processing, and probable potential value of the waste products. The fat content, particularly, is of the utmost importance in determining storage life.

For these studies samples of the different species of fish are being obtained by the Service's several technological laboratories from Service exploratory fishing vessels and from local fishing vessels and fish processors. Replicate samples of each species are being collected at various times of the year in order to detect any seasonal variations that might occur in composition of the fish.

A typical fish under study is the ocean perch (*Sebastes marinus*) being studied at the Service's Boston Fishery Technological Laboratory. Though this fish became commercially important 22 years ago, there exists today very little information on the proximate composition and especially seasonal variations in its composition. Samples of the ocean perch have been collected periodically since February 1956.



Fig. 1 - Chemist determining the protein content of fishery products.

The physical analysis was performed by removing the fillets from each fish and then skinning the fillets. The average skinless fillet yield has been 27.7 percent, thus leaving an offal yield of 72.3 percent. The average proximate chemical analysis of the skinless fish fillets is: water, 79.6 percent; protein, 18.1 percent; fat, 1.7 percent; and ash, 1.1 percent. The average analysis of the offal is: water, 70.5 percent; protein, 16.1 percent; fat, 7.1 percent; and minerals, 6.3 percent. So far, insufficient data have been obtained for the ocean perch to determine the effect of seasonal variations on composition of these fish.

Such data are necessary to determine the protein, carbohydrate, and fat content of diets. The data show that ocean perch fillets have, at least during certain seasons of the year, a relatively low fat content. In common with other fish products, ocean perch fillets contain practically no carbohydrate or sugar components.



## ANTIBIOTICS FOR FISHERY PRODUCTS PRESERVATION

**STATUS OF USE IN THE U. S.:** The recent series of news items about the use of antibiotics to extend the storage life of food items, including fish protected by refrigeration, has caused considerable confusion in the fishing industry over the present status of the use of antibiotics in fishery products.

The use of such materials as antibiotics in food handling and processing is subject to approval by the U. S. Food and Drug Administration. Winton B. Rankin of that agency recently made this statement on the present status of the use of antibiotics in foods from the standpoint of the Federal Food, Drug and Cosmetic Act:

1. They may be used so that no residues remain in the food. This is acceptable.



2. They may be used so that residues remain in the uncooked food provided:

- a. The food is always cooked;
- b. The cooking destroys the antibiotics;
- c. The official tolerance has been established under the Food, Drug, and Cosmetic Act for the residue that remains in the uncooked food;
- d. The residue is within this tolerance.

3. Antibiotics have been proposed for uses that will leave some of the chemical in the food as it is eaten. Their safety under these conditions has not been established. They should not be used in this way until we know more about the effect of the residues on man and micro-organisms.

The U. S. Food and Drug Administration has not approved the use of antibiotics in fish and fishery products. The conditions spelled out above have not been fulfilled for any fishery product. Any such products found to contain antibiotics before an appropriate tolerance has been established will be subject to seizures by that Agency.

The Canadian Food and Drug Administration has given approval for the use of certain antibiotics for fish preservation under carefully defined and controlled circumstances. However, fish or fishery products from that source or any other that are found to contain antibiotics, if detected while in import status, will be refused entry into the United States or, if already in the United States, will be subject to seizure by the U. S. Food and Drug Administration in conformity with the applicable legislation.



## TECHNICAL NOTE NO. 35 - IMPROVED WORKMEN'S STAND FOR PROCESSING PLANTS



Fig. 1 - Lift-up standing grate. Note the bearing, at the lower left-hand side of the photograph, on which the grate rotates. Note also the support, in the center of the grate, to keep the grate from springing.



Fig. 2 - Placing grate in working position. Note the wooden stop on the left-hand wall.



Fig. 3 - Grate in use. The top of the grate is protected by slip-proof paint.

This is a photographic report showing the details of construction and the method of employing a lift-up standing grate, which has proved both convenient to use and easy to clean. The grate was designed and constructed by Anton Stanovich of San Pedro, Calif.

#### ACKNOWLEDGMENT

The author acknowledges the aid of Jack A. Stanovich and Martin Stanovich of the Pioneer Fisheries in San Pedro.

--F. BRUCE SANFORD, CHEMIST,  
FISHERY TECHNOLOGICAL LABORATORY,  
BRANCH OF COMMERCIAL FISHERIES,  
U. S. FISH AND WILDLIFE SERVICE, SEATTLE, WASH.



#### FEDERAL AID FUNDS USED TO INCREASE SPORT FISHING OPPORTUNITIES

If a fishing lake does not exist, make one. If a fishing site exists, make it available to the public. If the lake is there and if it is accessible to the public but it needs improvement, develop it.


In the course of putting these simple rules into effect, the various states spent more than \$1,000,000 on Federal Aid land acquisitions for fishing purposes in the year ending June 30, 1956, Secretary of the Interior Fred A. Seaton announced October 14, 1956. Of this amount, \$790,000 was Federal Aid funds.

During the year, approval was given 17 states for the construction of 31 lakes having a total of 2,500 surface acres, and to 20 states for the acquisition of 6,358 acres of land and the leasing of an additional 56,846 acres for fishing and access to fishing areas.

Federal Aid funds for the restoration of fish are obtained through a 10-percent tax on certain sport fishing equipment.

In addition to Federal Aid projects, the various states make or develop other fishing areas or provide access to existing fishing spots using only state funds or money raised by civic-minded individuals or groups.

In providing access to fishing areas, state fish and game departments must meet the peculiarities of their own state water and trespass laws, considering such things as the navigability of the stream or lake. In many instances the public is entitled to proceed up and down a streambed, either wading or afloat. Here the problem may be only access to the edge of the stream. In other places and under certain conditions, wading or floating is not practical or legal and the right to use the stream or bank must be acquired. The same general principles apply to lakes.



# TRENDS AND DEVELOPMENTS

## Antibiotics in Food Industry Discussed at Symposium

The Fourth Annual Symposium on Antibiotics sponsored by the U. S. Department of Health, Education, and Welfare was held in Washington, D. C., on October 17, 18, and 19. While the principal emphasis in 136 papers was on the medical aspects of antibiotics in general, 18 papers were presented by representatives from antibiotics manufacturers, universities, government agencies, and others covering present and potential applications of certain antibiotics in extending fresh food storage life. Pertinent points of the food papers are as follows:

Aureomycin and terramycin apparently have the widest range of usefulness of any of the antibiotics in the food industry because of their effectiveness in inhibiting the growth of bacteria. Indications are that they are relatively nontoxic, and are destroyed in the usual cooking procedures such as boiling, frying, or baking.

Aureomycin (chlortetracycline) is now being used commercially to extend the refrigerated life of fresh poultry. The U. S. Food and Drug Administration has established a maximum tolerance of 7 p.p.m. for residues of aureomycin in or on uncooked poultry. Terramycin (oxytetracycline) has been released also for use in poultry under the same conditions. Commercial usage is controlled by the antibiotic supplier under a franchise program which demands high sanitary standards on the part of the food processor before the antibiotic is supplied.

Reports also indicate potential application of the antibiotics in extending the shelf life of other refrigerated foods, such as fresh and cured meats, fish, and shellfish. The method of applying the antibiotic is by dip, spray, ice, animal injections, or infusion of the carcass. However, at the present time the Food and Drug Administration has not sanctioned any commercial application to food items other than poultry. Also, it was stressed that the use of antibiotics is not a panacea. The antibiotics under consideration exert their effects only on bacterial populations. They do not control the growth of yeasts or molds nor do they prevent non-microbial changes in foods such as those produced by enzymes, oxidation, etc.

Since these antibiotics are destroyed by heat and also disappear during continued storage, they have no direct value in the permanent preservation of food. In cases of unavoidable delay between the harvest of food and its preservation by canning or freezing, the use of such antibiotics might prevent undesirable changes in the food during a reasonable period of time.



## Cans--Shipments for Fishery Products, January-August 1956



Total shipments of metal cans during January-August amounted to 77,154 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 67,214 tons in the same period of 1955. The month of August generally marks the peak month of the packing season for many fishery products. The packs of tuna, Maine sardines, and salmon in 1956 will all exceed the 1955 packs.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons by using the factor: 23.0 base boxes of steel equal one short ton of steel.

△△△△△

## California

**ALBACORE TUNA TAGGED OFF SOUTHERN CALIFORNIA (M/V Nautilus Cruise 56-N-2):** A total of 360 albacore and 9 bluefin tuna were tagged during a cruise (M/V Nautilus' cruise 2) from August 14 to September 6, 1956, by California Department of Fish and Game biologists. The objectives of the cruise were to tag albacore with type G "spagetti" tags as part of a study of migrations and growth; to determine the relationship between tag color and tag recovery; and to make physical and biological observations related to the occurrence of albacore. The tags were colored red, white, and blue and approximately an equal number of each color was used.

Three albacore and one bluefin tuna were subsequently recovered as follows: one albacore recovered six days after tagging, about 27 miles E. by S. of the release location; the second 41 days after tagging, about 116 miles NNW. of the releasing point; and the third soon after tagging at the point of release. The bluefin tuna was recovered 25 days later, 17 miles SW. of the releasing location.



Fig. 1 - Albacore tagging M/V Nautilus cruise 56-N-2 (Aug. 14-Sept. 6, 1956).

The areas fished had surface water temperatures ranging between 58.3° F. and 68.2° F. Examinations of all untagged albacore revealed different types of food for the various fishing areas. Fish from the Santa Cruz Basin were feeding heavily on squid and those from the Outer Santa Barbara Channel and the northern area had been feeding on sauries (*Cololabis saira*). A large percentage of the albacore examined had empty stomachs.

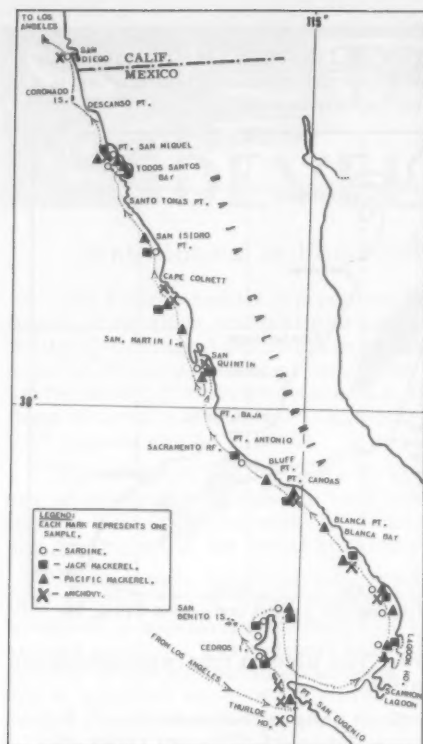
In addition to the albacore and bluefin tuna, specimens of rockfishes (*Sebastes*) were taken at Osborne Banks, San Clemente Island, and Santa Barbara Island, and sauries were commonly found under the night light in all offshore areas.

\*\*\*\*\*

**ABUNDANCE SURVEY OF SARDINES, JACK AND PACIFIC MACKEREL, AND ANCHOVIES CONTINUED BY M/V "SCOFIELD" (Cruise 5):** The second of five cruises along the Baja California coast from Turtle Bay to the Mexican border for the purpose of assessing the relative abundance of Pacific sardines, Pacific mackerel, jack mackerel, and anchovies was made by California's Department of Fish and Game research vessel N. B. Scofield. The cruise began on August 24 and ended on September 13, 1956.

During the cruise 78 light stations were occupied. Pacific sardines were sampled at 14 stations, Pacific mackerel at 19, jack mackerel at 12, and anchovies at 11.

The vessel traveled a total of 490 fish-scouting miles--196 schools were observed visually, of which 17 were Pacific sardines, 81 Pacific mackerel, 32 anchovies, and 66 were unknown. Hydrographic data was collected at all night-light stations.



M/V Scofield Cruise 5 (Aug. 24-Sept. 13, 1956).

toward the positive electrode. Secondly, if the current is pulsed or repeatedly interrupted, each pulse will cause the muscles of the fish to contract involuntarily.

These muscle contractions propel the fish through the water toward the positive electrode where they can be easily picked up or directed into some appropriate catching device. As long as the current is on, the movement of the fish is beyond his control—he cannot escape. It is of interest that the attracting power of a current is inversely proportional to the size of the fish and a given current will more readily attract a large fish than it will a small one.

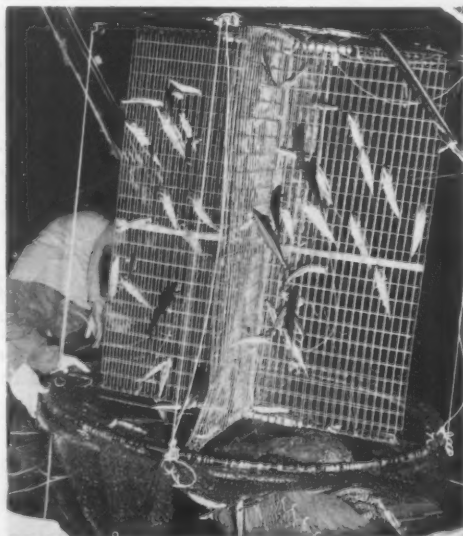
Electro-fishing has been used with great success in stream survey work by the Department's Inland Fisheries Branch as well as by other fresh water agencies. Unfortunately, the problems of handling electric current in the ocean are enormously more difficult than in fresh water.

Surface temperatures encountered on the cruise ranged from 13.55° C. (56.4° F.) at Pta. San Jose, to 23.45° C. (74.2° F.) in Turtle Bay. Fish were sampled in the following temperature ranges: Pacific sardine 14.91° C. (58.8° F.) to 23.45° C. (74.2° F.), Pacific mackerel 14.00° C. (57.2° F.) to 22.02° C. (71.6° F.), jack mackerel 15.27° C. (59.5° F.) to 20.60° C. (69.1° F.), and anchovies 13.80° C. (56.8° F.) to 23.45° C. (74.2° F.).

\*\*\*\*\*

**NEW TECHNIQUES IN OCEAN ELECTRO-FISHING DEVELOPED:** A preliminary series of experiments in electro-fishing devices and methods with a view of developing new techniques for sampling populations of marine fish have been completed by the Marine Fisheries Branch of the California Department of Fish and Game, points out the Department's September 1956 issue of Outdoor California.

Many years ago it was demonstrated that a direct current passed through the water between two electrodes will bring about some startling reactions in fish caught swimming between the electrodes. First of all, if the current is sufficiently strong, the fish will line up along the path of the current with their heads pointing



A "trouser leg" electrode. The fish are attracted to the wire mesh when the current is turned on. Once the fish are in, the webbing at the bottom is pulled up preventing their escape. In the photo, a portion of the Pacific mackerel and anchovies were attracted with such force that they became solidly wedged into the wire mesh of the electrode.

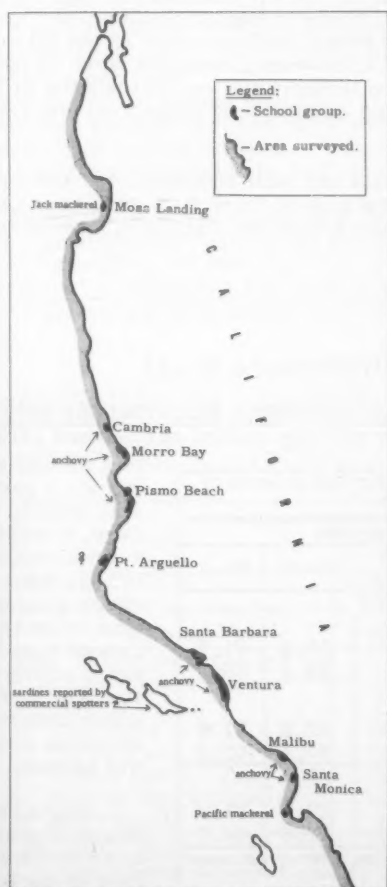


Because of the very high conductivity of salt water, almost a direct short circuit is produced, and the current would rather travel in all directions through the water than it would through the fish. This necessitates the use of extremely high amounts of current in order to affect the fish. However, the problem is being tackled independently in many countries of the world and it is only a matter of time before an economical and effective type of equipment is developed.

Since the Department's survey programs need only small samples of fish rather than commercial quantities, the emphasis of the experimental work has been toward obtaining the most efficient types of current and pulses with the limited power available on research vessels. At the same time, various types of electrodes which incorporate catching devices have been built and tested at sea.

Thus far the results have been most encouraging. We have been able to attract and capture small fish from distances in excess of 20 feet. It is reasonable to assume that continued experiments and modifications will improve our results even more and give us a truly revolutionary sampling method for marine research.

\* \* \* \* \*



Airplane spotting flight 56-8 (Sept. 27-28, 1956).



Airplane spotting flight 56-8 (Sept. 29, 1956).

**PELAGIC FISH DISTRIBUTION STUDY**  
(Airplane Spotting Flight 56-8): In order to continue the study of pelagic fish distribution, abundance, and behavior in central and southern California, that State's Department of Fish and Game operated an airplane spotting flight September 27-29, 1956. The survey was in the inshore area between Half Moon and Pt. Loma, Calif.

Anchovy schools increased in abundance to the south of San Simeon, but decreased in abundance in Monterey Bay since the last flight in August. In comparison with the past two seasons Pacific mackerel continue to be more abundant, but sardines are apparently less numerous and more widely distributed. Except for fog around San Francisco and off the Coronado Strand, clear skies and calm seas prevailed.

**Anchovy:** No anchovy schools were seen in the area between Half Moon Bay and Cambria. Apparently the spawning adult fish present in Monterey Bay earlier in the month (data gathered from commercial catch sampling) have either moved out of the inshore area or are now schooling deeply and cannot be seen in the daytime.

In southern California and in the central California area from Cambria to Pt. Arguello there has been a decided increase since August in the total area of anchovy schools. The greatest increases occurred near Pismo Beach, Huntington Beach, and San Clemente City. A total of 568 schools (11,689,200 square feet) were tallied in each 10-mile section of the coast in which anchovies were found.

**Sardine:** Fewer sardines were observed from the air this season than during the past two seasons. The schools seen off Pt. Dume in August could not be located. A commercial spotter sighted sardines off Pt. Dume on September 22 but failed to find them there on September 26. On October 1, however, sardines were caught at night in this area, so the sardines either moved temporarily out of the area or became "night fish," fish that school deeply during daytime and swim near the surface at night.

**Pacific mackerel:** Pacific mackerel schools are still abundant over the southern California area. The two largest concentrations of these fish were near Ocean side and Newport. Sardines were also seen mixed with the Pacific mackerel but in small numbers.



### Canned Fish Consumer Preference Study

**BRAND NOT ALWAYS DETERMINING FACTOR WHEN HOUSEWIVES BUY CANNED FISH:** More than half the housewives who buy canned salmon and sardines

Canned Fishery Product	Total	Regions			
		North East	North Central	South	West
Tuna <sup>1/</sup>	.....	(Percent) .....			
Ask for Brand .....	58.5	64.4	54.7	65.8	61.7
Do not ask for Brand ..	41.5	35.6	45.3	34.2	38.3
Salmon <sup>1/</sup>					
Ask for Brand .....	41.4	50.1	35.7	42.4	37.6
Do not ask for Brand ..	58.6	49.9	64.3	57.6	62.4
Sardines <sup>1/</sup>					
Ask for Brand .....	34.9	46.1	31.7	27.4	39.3
Do not ask for Brand ..	65.1	53.9	68.3	72.6	60.7

<sup>1/</sup> Of 2,700 households covered in the survey, 2,109 served canned tuna, 1,907 served canned salmon, and 1,394 served canned sardines.

buy without asking for a particular brand. However, a majority are influenced by brands when purchasing canned tuna because canned tuna is more widely advertised than either canned sardines or canned salmon.

Buying by brand is practiced by 58 percent of the housewives who pur-

chase canned tuna; by 41 percent who buy canned salmon; and by only 35 percent

who buy sardines. These facts were brought out by a recent nationwide sample survey of households.

In general, the practice of buying canned fish by brand name is more prevalent in the Northeast region and least in the North Central region.

These findings, which are based on a June 1956 scientific sample survey of 2,700 households distributed throughout the United States, are a part of other data obtained on household consumers' preferences for canned fish and shellfish.

Note: See Commercial Fisheries Review, August 1956, p. 47.

\*\*\*\*\*

**CANNED FISH AND SHELLFISH GENERALLY AVAILABLE AT RETAIL:** Practically every housewife (97 percent) in the United States can purchase any item of

canned fish or canned shellfish she wishes at retail. This is the result of the effective functioning of the distribution system in this country. Only about 3 percent of all housewives can not purchase some item

of canned fish or canned shellfish for which they shopped. This small group mentioned such canned items as crab meat, dietetic tuna, clams, smoked fish, clam chowder, and canned whiting. Practically the same situation which exists nationally is observed in each of the four geographic regions.

Table 1 - Percentage of Households Indicating if Items of Canned Fish or Shellfish are Available at Retail					
	United States	North-east	Central	South	West
	(Percent)				
Usually Available....	97	97	97	97	94
Not Available .....	3	3	3	3	6
No. of Households ...	2,545	679	730	770	366

These findings are based on a June 1956 scientific sample survey of 2,700 households distributed throughout the United States. These data on availability of canned fish and shellfish are one part of a large amount of other data obtained on household consumers' preferences for canned fish and shellfish.

Note: See Commercial Fisheries Review, August 1956, p. 47.

\*\*\*\*\*

**HOUSEWIVES BUY TWO OR MORE CANS OF PET FOOD AT A TIME:** About 95 percent of the families in the United States who own a dog or a cat buy two or

Table 1 - Number of Cans of Pet Food Bought at One Time in Terms of Percentages

Item	Total	Regions			
		North-east	North Central	South	West
All Households Owning a Dog or Cat That Use Pet Food Containing Fish <sup>1/</sup>	(Percent)				
	100.0	2/ 100.0	2/ 100.0	100.0	2/ 100.0
No. of Cans Purchased at One Time:					
One Can .....	5.3	4.8	7.7	3.6	5.8
Two Cans .....	10.5	14.5	12.1	9.5	5.8
Three Cans .....	22.9	27.7	19.8	21.2	24.6
Four Cans .....	15.2	12.0	18.7	16.8	11.6
Five or More Cans ....	45.0	41.0	40.6	48.2	49.3
Don't Know .....	1.1	-	1.1	0.7	2.9
Weighted Base	380	83	91	137	69

<sup>1/</sup> Some households own more than one pet. <sup>2/</sup> Relatively unstable due to the small number of cases.

more cans of pet food at a time. Forty-five percent of the pet owners usually purchase five or more cans. Another 15 percent usually buy in units of four. About one in every three families in the United States owns a dog and one out of five families owns a cat.

These findings are based on a recent scientific sample survey of household consumers' preferences for canned fish and shellfish which was conducted among 2,700 households distributed throughout the United States. One of the objectives of the survey was to determine the most frequent answer to the question "How many cans of pet food do you usually buy at one time?"

The responses indicate that it might be advisable for processors to consider packaging cans of pet food in handy containers holding more than one can.

Final results of the survey, which is being financed by funds provided by the Saltonstall-Kennedy Act of 1954, are scheduled for publication the early part of next year. The Fish and Wildlife Service contracted with W. R. Simmons and Associates Research, Inc., New York City, to conduct the survey.



### Federal Purchases of Fishery Products

Fig. 1 - Canned Fishery Products Purchased Through Quartermaster Market Centers, January-September 1956

Period	Tuna	Salmon	Sardines
	... (1,000 Pounds) ...		
Jan-Sept. ....	2,227	601	231

### CANNED FISHERY PRODUCTS PURCHASED THROUGH QUARTERMASTER MARKET CENTERS, JULY-SEPTEMBER 1956:

Only insignificant amounts of canned tuna and sardines were purchased for the use of the U. S. Army,

Navy, Marine Corps, and Air Force by the Army Quartermaster Corps through its Market Centers during the third quarter of 1956. Purchases amounted to 39,000 pounds of canned tuna and 4,000 pounds of canned sardines. No canned salmon was purchased.

Note: Also see Commercial Fisheries Review, October 1956, p. 15.

\* \* \* \* \*

**FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPARTMENT OF DEFENSE, SEPTEMBER 1956:** The Army Quartermaster Corps in September 1956 purchased about 2 million pounds (valued at \$996,628) of fresh and

frozen fishery products for the use of the Army, Navy, Marine Corps, and Air Force. This was 31.5 percent less in quantity and 29.0 percent less in value than the purchases made in August 1956, but higher by 8.8 percent in quantity and 20.7 percent in value than purchases made in September 1955.

Purchases of Fresh and Frozen Fishery Products by Department of Defense (September and the First Nine Months of 1956 with Comparisons)

QUANTITY				VALUE			
Sept.	Jan.-Sept.	Sept.	Jan.-Sept.	Sept.	Jan.-Sept.	Sept.	Jan.-Sept.
1956	1955	1956	1955	1956	1955	1956	1955
... (1,000 Pounds) ...				... (\$1,000) ...			
1,958	1,799	20,232	19,257	997	826	10,105	8,296

Purchases of fresh and frozen fishery products during the first nine months of 1956 totaled 20.2 million pounds (valued at \$10,104,809)--an increase of 5.1 percent in quantity and 20.7 percent in value than purchases made during the same nine months in 1955.

Prices paid for these fishery products averaged 50.9 cents a pound in September 1956 as compared with 49.1 cents a pound the previous month and 45.9 cents a pound in September 1955.

\*\*\*\*\*

#### NEW AGENCY REPLACES QUARTERMASTER MARKET CENTER SYSTEM:

As a major step towards activating the single manager subsistence program, the Military Subsistence Supply Agency (MSSA) was established, effective October 26, 1956, to replace the Quartermaster Market Center System.

The new organization effects the following changes: (1) Quartermaster Market Center System, 226 West Jackson Blvd., Chicago 6, Ill., changed to Headquarters, Military Subsistence Supply Agency at the same address; (2) the Quartermaster Market Centers changed to Military Subsistence Market Centers.

The new organization will be somewhat limited in functions until the completion of transfer of the Quartermaster Inspection Service Command and some other food distribution services. All military subsistence supply has now been brought under the jurisdiction of the new organization.



#### **Fish Sticks First to Bear U. S. Shield and Grade Labelling**

The first fishery product ever to bear the U. S. shield and grade labelling, indicative of voluntary continuous in-plant inspection and grading, is now available on the market. This is the consummation of the work of U. S. Fish and Wildlife Service technologists working on frozen fried fish sticks in cooperation with members of the fishing industry and with the National Fisheries Institute. The U. S. Department of Agriculture, using the standards and inspection manuals developed by the Department of Interior's Fish and Wildlife Service, now makes this inspection and grading service available to the industry. Three plants processing fish sticks are now under continuous inspection. Other specific lots of fish sticks are now being graded at the request of prospective buyers.

The Service is continuing its work on the development of standards for the fishing industry. It is planned that similar proposed standards, now well-advanced, for frozen fish fillet blocks and for raw breaded fish portions will be published in from three to five months. Thus, a complete set of interrelated standards will soon be available for use in a grading service from the raw material stage to the important heat-and-serve products of one segment of the fishing industry.



#### **Georges Bank Hydrographic Resurvey Planned**

A resurvey of Georges Bank, off the Massachusetts coast, an area which is considered by the New England commercial fishing industry as its most important economic asset, will be made by the U. S. Coast and Geodetic Survey, the Secretary of Commerce announced October 30, 1956.

Such a survey of the famous shoals area, the first in 25 years, is needed, the Secretary said, to provide more accurate hydrographic information for the North



Atlantic fishing fleet and a detailed survey in the vicinity of the first Air Force-operated Texas Tower, radar warning station of the Air Defense Command, located at Georges Bank.

The Coast and Geodetic Survey Ship Hydrographer, which has been operating this past year in the Straits of Florida and the Caribbean, is preparing to shift its operations to Georges Bank in March of 1957. It is hoped that the project can be completed within a single surveying season, ending about October 1. The 67-foot Hydrographer has a complement of 65 officers and men, plus occasional extra technicians.

Commercial fishing industry spokesmen have advised the Department of Commerce that fish production from the Georges Bank area is particularly vital to the fishing industry of Boston. Other ports, such as Gloucester and New Bedford, depend heavily on this bank for a constant supply of fish.

In addition to the periodic inspections and checks made by the Coast and Geodetic Survey, many fishing skippers and boat owners in recent years have been reporting evidence of a series of major changes in the shoals and channels of the Georges Bank area which they believe could be of serious import to normal fishery activities. These reported changes have created much anxiety and apprehension among all fish producers, and it is believed that the forthcoming new survey will prove of extreme value to them.

Coast and Geodetic Survey officials also are contemplating the possibility of a partial resurvey of the Nantucket area, where the next Texas Tower is to operate, after the completion of the Georges Bank hydrographic study. The Nantucket area was last surveyed in detail during 1940.

The survey of the Georges Bank area, beginning about 60 miles east of Cape Cod, will cover about 4,600 nautical square miles of Atlantic Ocean bottom, resulting in greatly improved charts for the safety of navigation and the fishermen's operations there.

The Radio Accoustic Ranging System, used when the existing Coast and Geodetic Survey charts for Georges Bank were first published in 1931-32, is now obsolete. Much more modern and accurate methods are now employed, notably the Electronics Position Indicator System.

Equipped with this system, a combination of features of Loran and Shoran, the Hydrographer two years ago made a new survey of Brown's Bank, off Nova Scotia, another area used extensively by the fishing fleet. Such surveys contribute not only to the development of maritime resources and especially aid the fishing industry, but they also assist in meeting national defense planning needs.

The Hydrographer was one of four Coast and Geodetic Survey ships which made thousands of soundings and took numerous samples of ocean bottom deposits in conducting the Georges Bank survey of the early Thirties. The charts and other data thus produced developed a wealth of detail of great value to the fishing industry. Deep gorges or valleys, some more than 150 fathoms deep, were discovered on the eastern and southern profiles of Georges Bank, and information about bottom characteristics proved another important factor in the carrying out of fishing operations, not only in regard to navigation but also in the study of the movement of fish.

With the recent evidences of changes in ocean bottom in the Georges Bank area, the forthcoming new survey is designed to bring all charts up to date and supply additional data to assist the fishermen and operators of both small and large vessels who ply the waters there.

The survey ship which will be used to make the Georges Bank survey has been engaged in its unique type of duty since she was launched at Portsmouth, Virginia, in 1929. The 1100-ton Hydrographer has had her outer appearance changed several times through the years as she has been re-equipped to keep her abreast of scientific advances and service. She has two 26-foot power launches which permit her crew to survey shoal areas too shallow to accommodate the mother ship.



### Great Lakes Fishery Investigations

SURVEY OF SAGINAW BAY CONTINUED BY M/V "CISCO" (Cruise 7): Experimental fishing during a cruise by the Service's research vessel Cisco from October 2-5, 1956, was confined to Saginaw Bay. Considerable trawling was done in a very shallow area near the southwest end of the Bay. This area had not been visited before, since weather conditions need to be ideal for the Cisco to venture into such shoal water. Yellow perch (Perca flavescens) fingerlings were numerous, and alewife fingerlings (Pomolobus pseudoharengus) were extremely abundant. About 6,000 of the latter species, ranging in length from 1.5 to 3.0 inches, were taken in a 35-foot trawl in one 5-minute bottom tow, and 8,500 were caught in a 5-minute tow just off the bottom. Smelt (Osmerus mordax) fry were almost as plentiful as the alewives off the bottom, but not nearly so numerous on the bottom. Small numbers of young-of-year black crappies (Pomoxis nigromaculatus) and bluegills (Lepomis macrochirus) were also caught in the shallow water. Trawling operations were also carried out in 6 to 11 fathoms off East Tawas. Catches consisted mostly of perch and smelt fry. Most of the adult smelt appear to have left this portion of the Bay; probably a seasonal movement. Night trawling studies were carried out in the area north and west of Charity Island. Midwater tows and bottom tows in the shallower ( $3\frac{1}{2}$ -4 fathoms) waters caught only a few perch and smelt fry, but one 5-minute bottom drag with a 35-foot net in deeper water (11 fathoms) took nearly 1,800 perch.

Gill nets were set obliquely from surface to bottom off East Tawas in 13 and 26 fathoms of water, and a bull net (300 feet long, 120 meshes deep) was set at the latter depth. Nothing was taken at the shallower depth. The deeper oblique set caught only a few bloaters (Leucichthys hoyi), longjaws (Leucichthys alpenae), and smelt. The fish were concentrated between 80 and 140 feet under the surface. The bull net was set so that its float line was just above the thermocline at 120 feet, and its lead line was beneath the thermocline at 140 feet. It caught 120 bloaters, 2 longjaws, and 41 smelt in an overnight set. Lake herring (Leucichthys artedii) have apparently not yet entered the Bay in any numbers for spawning, since none of this species was caught.

A gill net ( $2\frac{1}{4}$ -,  $2\frac{1}{2}$ -,  $2\frac{3}{4}$ -, 3-, and 4-inch mesh) set on the bottom in the harbor just off East Tawas in  $4\frac{1}{2}$ -5 fathoms of water caught 168 medium-size perch. The catch also included two walleyes (Stizostedion vitreum), one white bass (Lepibema chrysops), and 24 white suckers (Catostomus commersoni).

Hydrographic transects were run from Bay City to East Tawas, East Tawas to Harbor Beach, East Tawas to Oak Point, and Hat Point to Au Sable Point. Surface water temperatures are continuing to drop and the epilimnion has become about 125 feet thick. Surface water temperatures ranged from 10.8° C. (51.4° F.) to 15.4° C. (59.7° F.).



## Hawaii

**COMMERCIAL FISHERIES CATCH FOR 1955:** The landings in 1955 of ocean-caught fish and shellfish by the commercial fishermen of the Territory of Hawaii amounted to 15.4 million pounds, valued at \$3.1 million, according to a statistical summary from the Hawaiian Division of Fish and Game. This total was lower by

**Table 1 - Hawaiian Commercial Fish Catch and Value by Species, 1955 and 1954**

English	Species	1955		1954	
		Quantity 1,000 Lbs.	Value \$1,000	Quantity 1,000 Lbs.	Value \$1,000
<b>Ocean Catch:</b>					
Amberjack	Kahala	83	17	68	13
Big-eyed scad	Akule	304	192	324	205
Dolphin	Mahamahi	265	86	236	77
	Weke-ula				
Goatfish	Weke	151	92	169	100
	Moana				
Jack crevalle	Ulua	170	54	215	63
Mackerel	Opelu	388	96	274	88
Sea bass	Hapoupuu	66	20	40	12
<b>Snapper:</b>					
Gray	Uku	82	28	66	24
Pink	Opakapaka, kalekale	215	94	175	71
Red	Ulaula Koe & Ulaula	104	75	105	72
<b>Swordfishes &amp; Spearfishes</b>	A'u	787	185	1,063	183
<b>Tuna &amp; Tunalike Fish:</b>					
Albacore	Ahi	21	4	29	5
Bluefin					
Big-eyed		3,154	687	2,750	672
Yellowfin		446	140	526	137
Skipjack		9,695	1,115	14,021	1,761
Bonito		40	7	23	4
Miscellaneous		480	203	432	166
<b>Total Ocean Catch</b>		<b>15,351</b>	<b>3,097</b>	<b>20,525</b>	<b>3,653</b>
<b>Pond Catch:</b>					
Clam	Olepe	7	1	13	3
Crabs		5	2	4	2
Milkfish		15	8	16	7
Mullet		52	43	41	37
Tenpounder		5	2	2	1
Miscellaneous		22	12	10	5
<b>Total Pond Catch</b>		<b>107</b>	<b>68</b>	<b>86</b>	<b>55</b>
<b>Grand Total</b>		<b>15,458</b>	<b>3,165</b>	<b>20,611</b>	<b>3,708</b>

1/ Revised. Note: Also see *Commercial Fisheries Review*, May 1955, p. 30.

\$0.246 a pound in 1954. In addition to the ocean catch, 106,868 pounds, valued at \$68,566, of pond fish were reported as compared with 86,000 pounds, valued at \$55,000 dollars in 1954.

The 1955 commercial catch of ocean fish from the island of Oahu made up 71.7 percent of the total. Of the six island areas that reported a commercial fish catch, 71.4 percent was made during the April-September period. The best single month's catch was made in June when 17.3 percent of the ocean catch was landed.



### Marketing Prospects for Edible Fishery Products, Winter 1956/57

United States civilian consumption of fishery products during the six months of September 1956-March 1957 is expected to be slightly larger than a year earlier. The increase will likely be both in the canned and the frozen commodities. Retail prices of fishery products in the coming months are expected to remain above a year earlier.

Supplies of fresh and frozen fishery products through next winter may total close to those of a year earlier. Commercial landings, now on the seasonal downturn, are not expected to differ substantially from those of last fall but moderately

heavier imports of frozen products are likely. Stocks of edible frozen products in cold storage on October 31 were larger than those on the same date last year. Storage holdings are the most important source for frozen fishery commodities consumed during the winter months when commercial landings are seasonally lowest.

More canned fishery products will be available during the current marketing year--which ends about mid-1957--than in the preceding year. The 1956 pack of salmon was a little larger than the very small output in 1955, but the packs of Maine sardines, tuna, and mackerel will be up considerably. The current year's pack of California sardines (pilchards) is now under way, and it is still too early to forecast the output. Domestic production of canned fishery products during the current marketing year will be supplemented to some extent by imports. Canned salmon imports probably will again be heavy since the pack increase in the United States and Alaska is not sufficient to meet expected consumer demand.

Total imports of the major fishery products in the next few months are expected to continue at a higher rate than a year earlier. The larger part of the increase probably will be for the frozen items; imports of the canned products will likely be up only slightly. Exports during the next few months may be no larger than a year ago because of the limited supplies of the canned fishery products which are popular in our foreign markets.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the U. S. Fish and Wildlife Service, and published in the former agency's November 2, 1956, release of The National Food Situation (NFS-78).



### Maine Sardines

CANNED SARDINE STOCKS, NOVEMBER 1, 1956: Distributors' stocks of Maine sardines totaled 388,000 actual cases as of November 1, 1956, an increase of 34,000 cases or 9.6 percent over the 354,000 cases held by distributors on November 1 a year earlier. Stocks of Maine sardines held by distributors on July 1, 1956, amounted to 154,000 cases according to estimates made by the U. S. Bureau of the Census.

Fig. 1 - Canned Maine Sardines--Wholesale Distributors & Cannery Stocks, November 1, 1956, with Comparisons

Fig. 1 - Canned Maine Sardines--Wholesale Distributors & Cannery Stocks, November 1, 1956, with Comparisons							
Type	Unit	1956/57 Season	1955/56 Season				
		11/1/56	7/1/56	6/1/56	4/1/56	1/1/56	11/1/55
Distributors' Stocks	1,000 Actual Cases	388	154	160	268	326	354
Canners' Stocks	1,000 Actual Cases <sup>1/</sup>	1,016	315	64	152	475	625
<sup>1/</sup> 100 3/4 -oz. cans equal one standard case.							

<sup>1/</sup>100 3 $\frac{1}{4}$ -oz. cans equal one standard case.

Canners' stocks on November 1, 1956, as reported by the Maine Sardine Industry were 1,016,000 cases (100-3 $\frac{1}{4}$ -oz. cans) on November 1, 1956, as compared with 625,000 cases on the same date in 1955. Stocks held by the canners on July 1, 1956, totaled 315,000 cases.

The pack of Maine sardines from the beginning of the season on April 15 to November 1, 1956, totaled 2,101,000 cases, 80 percent or 934,000 cases above the pack

on the same date in 1955. The pack of Maine sardines in 1954 amounted to 2,934,000 standard cases (100  $3\frac{1}{4}$ -oz. cans).

\*\*\*\*\*

CANNING SEASON ENDED DECEMBER 1 WITH FAIR PACK: The 1956 Maine sardine season closed on December 1, 1956, with a pack of about 2,200,000 cases (100  $3\frac{1}{4}$ -oz. cans), states the Maine Sardine Council in a December 1 news release.

The Executive Secretary of the Council said that the pack was well ahead of the abnormally short pack of about 1,268,843 cases in 1955, but still far below the 2,690,000-case (10-year) average.

Thirty-eight plants from Portland to Robbinston, Maine, were in operation during the seven-months season, but the fish ran consistently only in waters west of Rockland, or the southern half of the State. This area supplied most of the sardines for Washington County at the eastern end of the State, which has a heavy concentration of plants.

The Washington County canners were plagued with a scarcity of fish in their area for the fifth year in a row and are patiently awaiting a report from biologists who are endeavoring to find the reason and the cure.

The Secretary said that rising costs and the fluctuating fish supply clouded the profit picture for canners despite the fairly large pack. Sales were normal throughout the season and he predicted a sellout of the pack before the plants started operating again in 1957 (season April 15-December 1).

Due to the short 1955 pack, the sardine industry went into the new season with one of the smallest carry-overs in history and the total supply is predicted to be inadequate to fill the normal demand.

He stated that the canned pack was of excellent quality and that the canners had been given much assistance along these lines through an industrywide research and grading program which was launched three years ago.



## North Atlantic Fisheries Exploration and Gear Research

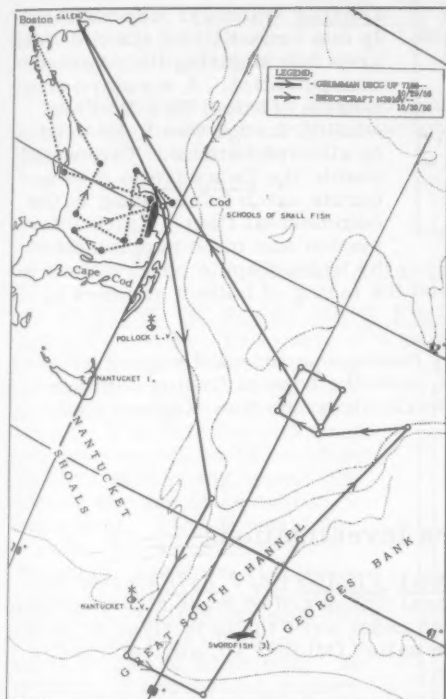
BLUEFIN TUNA COMMERCIAL DISTRIBUTION IN NORTHWEST ATLANTIC SURVEYED BY M/V "DELAWARE" (Cruise 27): Over 1,600 miles of the offshore Northwest Atlantic area was scouted by the Service's exploratory fishing vessel Delaware for possible commercial concentrations of bluefin tuna (*Thunnus thynnus*) during cruise 27, completed on November 2, 1956. Results from the exploratory work indicated sizable surface schools were present in the South Channel area, but the area far offshore and south to the vicinity of the Gulf Stream track produced no positive indications of surface-schooling tuna.

Several surface schools of varying size were spotted in the general area of the South Channel. The school sizes ranged from scattered breaks to one area of 200 yards in diameter. Surface temperatures in the area of the bluefin schools ranged from 57° to 67° F. Troll lines were used continuously while running during daylight hours with only two strikes during the trip, one a 32-pound bluefin taken in the South Channel area and one small dolphin (*Coryphaena hippurus*) taken while trolling



near the Gulf Stream. Seventeen dolphin were caught on hand lines during the trip.

Ten small schools and one medium-size school (estimate 15 tons) were sighted by the Delaware soon after departure from Boston on October 16, 1956.



Aerial fish spotting flights (56-1 & 2) October 29 & 30, 1956.

spotting in conjunction with the Delaware's cruise 27 was conducted on October 29, 1956, when an opportunity to accompany a U. S. Coast Guard overwater training flight gave an excellent chance to survey the South Channel area (flight 56-1). Although conditions were ideal for fish spotting, no surface schooling tuna were spotted. Three swordfish were seen in the east side of the South Channel and several (12+) large schools of small fish near shore in Cape Cod Bay extending south from off Provincetown. Also, one school was sighted in shallow water near Race Point. Cape Cod Bay was not searched on the 29th for tuna, as the major objective of the survey was the offshore area.

During the evening of the 29th, over 37,000 pounds of bluefin were taken in the Provincetown traps and as a result a flight to survey the Cape Cod area was made on October 30, 1956 (flight 56-2). The extensive schools of small fish (unidentified as to species) were still present in the inshore area with the center of distribution about three miles S. of Provincetown. A small school of bluefin (15-20 in number) was spotted in the bay about 5 miles S. of Provincetown indicating that tuna were still present in the inshore areas.

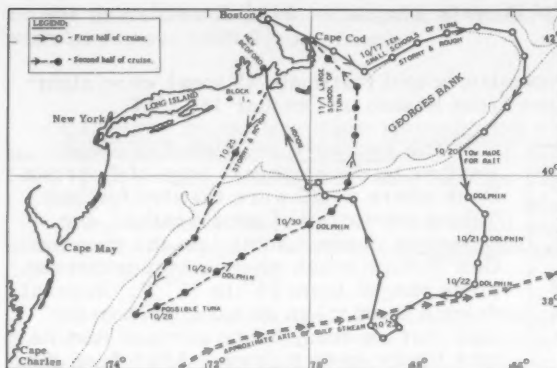
The Delaware was scheduled to depart from East Boston, November 14, 1956, to conduct exploratory scallop dragging in offshore areas where the commercial fleet does not normally operate.

The Delaware proceeded in rough weather to the northeast edge of Georges Bank where squid were trawled for bait. Taking advantage of good weather, the Delaware scouted south into the warmer Gulf Stream track where water temperatures ranged from 74° to 75° F. Several dolphin were taken on hand lines in the Gulf Stream area, but no surface tuna or bird flocks were sighted. After scouting along the northwest side of the Gulf Stream, the Delaware returned toward the coast. Rough weather making scouting for school tuna virtually impossible was encountered both before and after leaving the port of New Bedford.

After proceeding SW. from New Bedford, two possible tuna schools were sighted in the area 38° 18' N. latitude, 69° 30' W. longitude. Several dolphin were again taken by hand line in the warmer water, the largest weighed 26½ pounds.

Upon returning to the South Channel area on November 1, 1956, 3 large schools of bluefin were sighted and chumming with squid was attempted, without results; however, trolling in the area for some period of time produced one 32-pound bluefin.

#### Flight Report 56-1 & 2: Aerial fish



M/V Delaware Cruise 27 (October 16-November 2, 1956).

the form of bottom temperature recordings, and the taking of bottom samples at specified intervals.

This is the first in a series of exploratory fishing operations designed to investigate the many areas not fished at present, with the hope of finding commercially-profitable scallop beds which would be available to the New England fleet.



## North Atlantic Fisheries Investigations

### STUDIES INTO FEEDING HABITS OF LOCAL FISHES (M/V T-79 Cruise 8):

To conduct studies into the feeding habits of local fishes and to make a hydrographic transect of the "Deep Hole" off the New England coast were the objectives of cruise 8 of the Service's research vessel T-79, which sailed October 10, and returned to Woods Hole, Mass., October 12, 1956.

The hydrographic transect of "Deep Hole" was accomplished without difficulty. Samples of water were saved for salinity, phosphate, and nitrate analysis. On September 12 (T-79 Cruise 6), a moderately-developed thermocline existed throughout the area with a temperature spread from top to bottom of more than 15° F. On October 13 the surface had cooled over 6° F. and the thermocline was gone, the spread of temperature being less than 7° F. in the deepest part. The picture presented by the distribution of nutrients and O<sub>2</sub> showed that the "Deep Hole" was in a state of flux. A wedge of water moving into the "Deep Hole" from the onshore side was replacing the colder and nutrient deficient water. Within this wedge, local fishermen were catching relatively large numbers of blackback flounders in addition to the other species commonly found there.

Where the bottom water had not yet been replaced, no blackbacks were caught. On September 12 when conditions were relatively stable, the common flatfish on the edge of the "Deep Hole" was the yellowtail flounder. No yellowtails were caught during this cruise.

\*\*\*\*\*

UNDERWATER TELEVISION OBSERVATION OF FISH CAPTURED BY OTTER TRAWL: In order to observe the behavior of fish while being captured by an otter trawl, the Service's North Atlantic Fisheries Investigations chartered the M/V Huckleberry Finn for some underwater observations with a television camera. The

The two-week scallop exploratory trip was to systematically survey portions of Brown's Bank and areas within the Gulf of Maine for commercial concentrations of ocean scallops (*Pecten grandis*). Approximately one week will be spent in each area investigating its commercial potential. A standard commercial 11-foot New Bedford scallop dredge was to be used in all explorations. This would enable the Delaware to give accurate catch information to the commercial fleet. Catch information was to be supplemented by hydrographic observations in

Huckleberry Finn was joined on the Amagansett grounds off Long Island, N. Y., by the William Chesebrough, a Pt. Judith trawler trawler. The cruise operations were conducted October 29-November 1, 1956.

The otter trawl was located by a recording echo-sounder approximately 450 feet behind the trawler William Chesebrough, in 50 to 80 feet of water. A tow line was made fast from the Huckleberry Finn to maintain this distance. The television camera with fins attached and an "Issacs" depressor at the end of the support chain was lowered to observe the net.

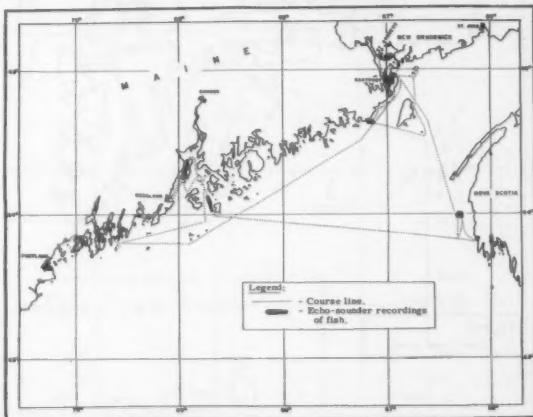
Locating the net was difficult because of turbidity and the variables involved in positioning the camera with a two-boat operation. Some views of netting at close range were obtained however.



### North Atlantic Herring Research

SETTING OF PURSE SEINE FROM DECK OF DRAGGER TESTED (M/V Metacomet Cruise 9): Trial sets of a purse seine were made in Linekin Bay and Penobscot Bay by the Service's char-

tered exploratory fishing dragger Metacomet in order to determine if a New England dragger-type vessel could be adapted to purse-seining operations without the use of an auxiliary seine boat. Then it would be possible for a vessel of such seaworthy design as the Metacomet to be used in offshore waters of the Gulf of Maine without running the risk of losing a valuable seine and seine boat. In addition, if successful, purse-seining from the deck of a vessel (particularly if the power block was used) would enable the vessel to operate with about half the crew needed to set and purse the seine by the traditional methods used in the Gulf of Maine. In New England, purse seiners using the combination mothership and seine boat are limited to fishing during good weather. The second objective of this ninth and final cruise (October 18-27, 1956) of the Metacomet was to locate herring by echo-sounder and visual observation.



U. S. Fish and Wildlife Service cruise 9 of chartered M/V Metacomet.

The waters indicated on the chart were sounded. Fish were located in Passamaquoddy Bay, Grand Manan Channel near Cutler, Trinity Ledge on the Coast of Nova Scotia, Isle Au Haut Bay, and West Penobscot Bay. Echo-sounder recordings and sampling with a small midwater trawl indicated that the fish located in these areas were small herring between 3 and 5 inches in length. The seine was not set on these soundings since the fish were too small and often too deep to be caught.

The waters indicated on the chart were sounded. Fish were located in Passamaquoddy Bay, Grand Manan Channel near Cutler, Trinity Ledge on the Coast of Nova Scotia, Isle Au Haut Bay, and West Penobscot Bay. Echo-sounder recordings and sampling with a small midwater trawl indicated that the fish located in these areas were small herring between 3 and 5 inches in length. The seine was not set on these soundings since the fish were too small and often too deep to be caught.

In each of the trial sets of the seine made in Linekin Bay and Penobscot Bay, the seine was set smoothly over the starboard gunwale from the well deck of the vessel. Purse lines were pulled through blocks on a seine davit to winch heads on the trawl winch and the seine was hauled aboard with a "Puretic" power block. Although some difficulty was experienced with the seine becoming fouled in the purse

line, these trials demonstrated that a purse seine can be set and hauled using this type of vessel, properly equipped. The problems of purse-line fouling might be overcome by small changes in the method of setting and pursuing the net or by slight modification of the seine hanging.

### North Pacific Exploratory Fishery Program



M/V John N. Cobb Cruise 29 (Oct. 1-Nov. 16, 1956).

pollock, and ratfish, were taken in this area in amounts from 150 to 2,400 pounds per hour. The dragging bottom off Baker Island was generally good at depths of 55 to 95 fathoms. Soundings made in the "trough" between Dall and Forrester Islands revealed no suitable dragging bottom. No clear dragging bottom was located along the 115-fathom "edge" between Forrester Island and Baker Island.

Favorable catches of rockfish were made at depths of 112 to 139 fathoms off Iphigenia Bay, with the best drag yielding a total of 2,100 pounds of rockfish, including 1,200 pounds of black rockfish, 800 pounds of Pacific ocean perch, and 100 pounds of red

#### BOTTOM FISH GROUNDS OFF SOUTHEASTERN ALASKA SURVEYED BY M/V "John N. Cobb"

(Cruise 29): Several species of commercially-desirable bottom fish were caught off the west coast of Prince of Wales Island, Alaska, during a cruise from October 1 to November 16, 1956, by the Service's exploratory fishing vessel John N. Cobb.

A series of 30 otter-trawl drags were made at depths of 57 to 208 fathoms between Dixon Entrance and Iphigenia Bay. Although good trawling bottom was located in some areas, extensive soundings made with a recording depth-sounder also revealed large areas of unsuitable trawling bottom. In some cases, bottom obstructions were encountered by the trawl gear where depth recordings had indicated favorable trawling bottom.

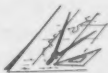
Although no large catches of commercially-desirable flatfish were made, several drags off Baker Island at depths of 57 to 95 fathoms caught dover sole, petrale sole, rex sole, and rock sole in amounts up to 200, 150, 250, and 175 pounds, respectively, an hour. Trash fish, mostly turbot,



A good catch of bottom fish being sorted aboard the M/V John N. Cobb.

rockfish in one hour. Turbot and pollock dominated the catches at these depths. The dragging bottom was exceptionally good in this area.

Stormy weather seriously curtailed exploratory fishing activities throughout the entire period of the survey, resulting in inconclusive findings regarding the extent of the available grounds suitable for otter trawling and the abundance of commercially-desirable species of fish present.



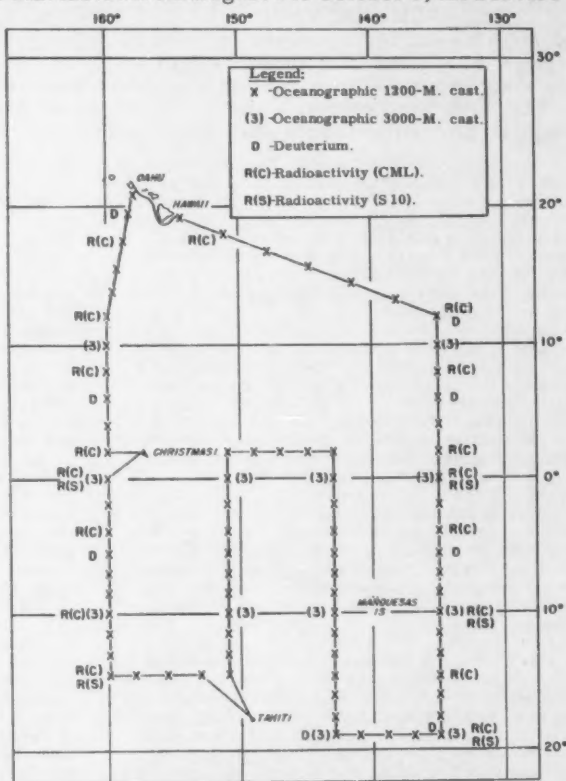
## Pacific Oceanic Fishery Investigations

**OCEANOGRAPHY OF PACIFIC EQUATORIAL REGION SURVEYED (Hugh M. Smith, Cruise 35):** During a cruise that lasted from August 1 to October 5, the Service's research vessel Hugh M. Smith occupied 79 oceanographic stations as part of an international survey (EQUAPAC) of the Pacific equatorial region between 135° W. longitude and the Philippine Islands. The area surveyed included a study of the circulation features and areas of potential productivity in the region of the Marquesas and Tuamotu Islands. A total of 79 oceanographic stations, bathythermograph lowerings, zooplankton tows, and pelagic trawl hauls were the principal operations during the cruise. Field examination of the plankton volumes showed that in general the quantities collected during night-time tows were 1 to 1½ times those taken during daylight hours and that the volume of plankton decreased rapidly south of the equator.

A watch was maintained during daylight hours for tuna schools and bird flocks while the vessel was under way. A total of 85 bird flocks and 60 tuna schools were sighted; 39 of the tuna schools were unidentified, 13 were identified as skipjack, and 8 as yellowfin. Of the 85 bird flocks sighted, only 28 were seen during passage south of the equator between 135° W. and the island of Tahiti, 43 were sighted between Tahiti and Honolulu. Of the 60 tuna schools, 36 were sighted between Tahiti and Honolulu, of which 24 were located between 4° S. and Christmas Island on 160° W.

A 45-station pattern, a continuation of the 18-month monitoring survey in the area of the Hawaiian skipjack fishery, was completed around the island of Oahu prior to proceeding south for EQUAPAC.

A 45-station pattern, a continuation of the 18-month monitoring survey in the area of the Hawaiian skipjack fishery, was completed around the island of Oahu prior to proceeding south for EQUAPAC.



M/V Hugh M. Smith Cruise 35 (August 1-October 5, 1956)-- shows oceanographic stations completed for EQUAPAC.

\* \* \* \* \*



**SKIPJACK TUNA TAGGED WITH HARPOON-TYPE TAG RECOVERED:** Considerable interest was engendered by the return of a skipjack tuna that had been tagged with the new harpoon-type tuna tag developed by the Pacific Oceanic Fishery Investigations. This tag is of all-plastic construction and so far has been placed on small lots of skipjack only. The single return, at liberty for 3 months, was surprising in view of the fact that only 45 specimens had been released with the new tag. The tag wound had healed nicely, and an autopsy of the specimen indicated that the fish was not at all handicapped by the new tag. It is too early to state just how successful the tag will ultimately be, but it is now known that it can be placed on tuna in approximately  $\frac{1}{4}$  the time that it takes to tag fish with the conventional "spaghetti" tag. This means that several times as many fish can be tagged with a given crew of men and that returns should be better, simply because the tuna are out of the water for only a few seconds during the tagging.

\* \* \* \* \*

**RESEARCH FOR THIRD QUARTER 1956 (July 1-September 30, 1956):** Highlights of the third quarter's research results of the Service's Pacific Oceanic Fishery Investigations included the finding of large numbers of albacore tuna north of Hawaii; completing tests on tilapia that establish its usefulness as tuna bait; completion of the field work of EQUAPAC, an oceanwide survey of the equatorial Pacific; and a second stocking of the Marquesan sardine in Hawaiian waters. Details of some of the research results follow:

**Equatorial Tuna Research:** In conjunction with POFI's oceanographic and fishing surveys in the Marquesas Islands area, the Service's research vessels Hugh M. Smith and the Charles H. Gilbert participated in EQUAPAC, the multiple-vessel survey of the Pacific equatorial region between 135° W. and the Philippines. Departing on August 6, 1956, the Charles H. Gilbert returned to Honolulu on September 26, 1956. Using long line, she found yellowfin tuna most abundant near the equator (132° W. longitude) and in the Marquesan coastal waters; big-eyed were never abundant, although a few large specimens (300-370 pounds) were taken between 5°-11° S. latitude. Albacore began appearing in the long-line catch at 12° S., but the greatest number of this species were taken in the Marquesan coastal waters. A few large skipjack were taken at scattered stations.

Only a few surface schools (16) were sighted in the vicinity of the Marquesas. Ten were chummed with Marquesan sardines. Five were identified as skipjack, one of which yielded 344 skipjack averaging 5 pounds in weight. A 16-pound specimen was taken from one yellowfin school fished.

Seven bays in the Marquesas were sampled for bait. Sardines (Harengula vittata was the predominant species) were seen in nearly every area scouted but were nowhere abundant. A total of 305 buckets of various species were caught; 62 buckets of the sardines were placed aboard the Charles H. Gilbert, returned to Oahu, and 21 were released in Hanalei Bay, Oahu.

Another tagged yellowfin was recovered during the quarter in the Line Islands area. This marks the second recovery from a total of over 1,000 tagged in this area. Tagged near Christmas Island on October 8, 1955, the yellowfin was recaptured in the same vicinity on August 2, 1956, thus was at liberty for 299 days.

**Albacore Research:** The most significant development during the quarter was the success of the exploratory fishing cruise of the John R. Manning (cruise 32) made from July 16 to September 12 to the waters north of the Hawaiian Islands. The purpose of the cruise was to determine if there

were sufficient quantities of albacore to support a commercial fishery in the area where they were found during the summer of 1955 by the vessels of the Service's Pacific Salmon Investigations, Paragon and Mitkof, and the POFI vessel Hugh M. Smith. The results of the cruise showed that they were present in parts of the area covered by the cruise, roughly 40° N. to 49° N. between 175° W. and 145° W., in amounts approaching commercial quantities. The pattern and magnitude of the individual catches showed that they were most abundant west of 160° W. between 43° N. and 47° N. East of 160° W. the catches decreased progressively to the eastward. A total of 604 albacore were taken; 453 in the gill nets, 47 in the trammel nets, and 104 on the trolling lines. The best day's catch in the gill and trammel nets was 89 and the best by trolling was 35. Eighty-six of the troll-caught fish were tagged and released. Almost all of the remaining fish (6,597 pounds) were delivered to the cannery. Only 102 pounds or about 2 percent of the fish were rejected, making the total penalty against catch 306 pounds or 4.6 percent. (See Commercial Fisheries Review, November 1956, p. 48).

Another item of interest during the quarter was the report of the capture of two more tagged albacore. They were both fish that had been released about a week apart during the fall of 1955. They were recaptured about 6 weeks apart, one in the Japanese spring fishery and one in the United States west coast fishery. The latter gives the first positive evidence of easterly migration of albacore from mid-ocean.

**Tuna Bait Studies with Tilapia:** In the spring of 1956, the Hawaiian Tuna Packers, Ltd. and the Pacific Oceanic Fishery Investigations joined forces in an informal agreement for the purpose of seining supplies of small bait-size tilapia and testing these fish at sea to determine their qualities as skipjack bait. Seven full days and 2 half days of seining yielded approximately 600 pounds of small tilapia. These were obtained from freshwater ponds and therefore had to be acclimatized to sea water before the sea tests.

The effective use of tilapia as skipjack tuna bait was examined on 14 vessel days at sea in

waters off Oahu. It was the prime objective of these tests to compare the ability of nehu (the standard bait) and tilapia in attracting and holding schools of skipjack at the stern of the vessel. A summary of the results shows that 21 (56 percent) of the 37 schools chummed with nehu surfaced and responded to the bait, whereas 10 (62 percent) of the 16 schools chummed with tilapia gave a favorable response to the bait.

Skipjack were caught from 9 schools at the rate of 3.5 fish per bucket of tilapia used. This is not as good as the catch rate of 8.2 skipjack per minute and 15.2 per bucket of bait obtained with nehu, but there is every reason to believe that with experience chummers will learn to use the new bait more effectively.

It is our conclusion that tilapia is an adequate bait for catching skipjack. In some respects it may be slightly inferior to nehu, but it has several compensating qualities. It is an exceedingly hardy fish and can survive in bait tanks for much longer periods than the nehu. The larger tilapia tend to sound when thrown out as chum, but this trait is not prevalent in fish  $1\frac{1}{2}$  to 2 inches in length, which is the optimum size for skipjack bait. Our studies

indicate that if economically feasible rearing methods can be developed, the tilapia can alleviate the great need in the Hawaiian skipjack fishery for additional bait supplies.

**"Greening" in Yellowfin:** In investigating the chemistry of "off-color" or "greening" in yellowfin tuna, additional studies have been conducted on the reflectal spectrophotometric characteristics of raw and cooked, normal and green meat. These have led to the conclusion that the pigment involved is a heme protein, probably myoglobin. Raw meat which will turn green on cooking seems to have unusual quantities of the ferric oxidized form, met-myoglobin. On cooking, denaturation of the globin produces relatively more of the reduced form, hemochrome, than the nonreduced form, hemichrome, in green as compared with normal tuna meat. It is the relative quantities of these two denatured globins, with different spectral reflectances which determine whether the meat will appear green or normal. Some evidence also exists for a low concentration of additional pigments in cooked green meat, which may be unusual hemi- or myoglobin derivatives. Both browning and greening seem to be manifestations of oxidation of the heme protein pigments.



## Salmon

**1956 PACK 25 PERCENT HIGHER THAN IN 1955:** Red salmon, coming back to their spawning grounds in numbers reminiscent of other days, spearheaded the 1956 Alaska salmon pack to an increase of more than 25 percent over that of 1955.

Table 1 - Alaska's Canned Salmon Pack by Species and Area, 1955-56

Species	1/ 1956				1955			
	South-eastern	Central	Western	Total	South-eastern	Central	Western	Total
(Standard Cases of 48 1-Lb. Cans) .....								
King .....	1,272	21,212	23,767	46,251	1,157	22,078	24,583	47,818
Red .....	72,851	341,030	579,761	993,642	55,561	233,290	332,793	621,644
Pink .....	634,272	516,140	3,918	1,154,330	540,495	696,880	90	1,237,465
Chum .....	294,282	365,088	32,197	691,567	177,667	162,999	22,968	363,634
Silver or Coho ..	46,497	49,015	4,388	99,900	64,814	47,294	2,476	114,584
Total .....	1,049,174	1,292,485	644,031	2,985,690	839,694	1,162,541	382,910	2,385,145

1/ Preliminary data.

Preliminary figures indicate a 1956 pack of 2,986,030 standard cases (48 1-lb. cans), or 600,000 cases above the 1955 total, and not far behind the 3,094,452 cases of 1954. While the pack is still below the long-term average, the trend which has been generally down since 1943 appears to have been arrested by the conservation measures which are now in effect.

Pink salmon still have "to turn the corner," but U. S. Fish and Wildlife Service officials report that current conservation practices, especially in Prince William Sound and southeastern Alaska, demonstrated their effectiveness in 1956.

One very encouraging aspect of the 1956 run is that escapement of both red and pink salmon to the spawning grounds in most areas was well above the average of recent years, a fact which portends well for the fisheries of future years. The total red salmon run in the Naknek-Kvichak section of Bristol Bay was approximately 15 million fish, of which 11 million avoided the nets and kept on toward the

spawning grounds. Heavy escapements of red salmon are reported in the Nelson Lagoon and Sandy Lake and other places along the Peninsula. Chignik experienced a good escapement of red salmon and in Cook Inlet the escapement is reported to have exceeded anything achieved in recent years; that of Prince William Sound pink salmon was reported excellent, while escapement of that species in southeastern Alaska is listed as good to excellent.

Since the life cycle of the salmon varies from two years with the pinks to four to six years with the reds, results of the 1956 escapements will be reflected in the runs of 1958 and later years.

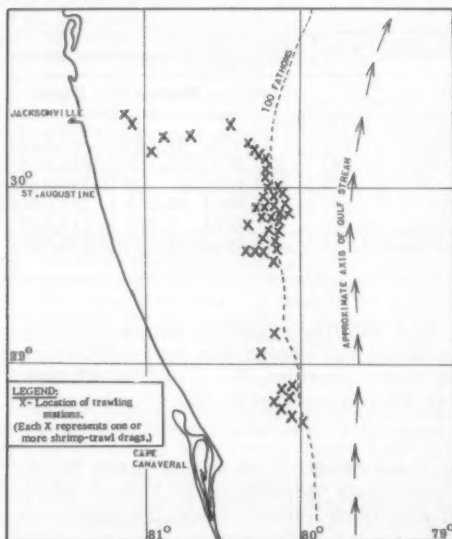
Little is known of that part of the salmon's life spent at sea but biological studies are being made on this phase of its life history at the present time. The pink salmon caught this year were smaller than average, going 22 to 25 to the case instead of the usual 17 or 18.

Conservation measures being practiced at the present time include provisions for adequate escapement, better protection of the spawning beds, reduction of predators, stream clearance, etc. Biological research includes: numerous studies on depredation and other natural factors which affect the salmon from the time the mature fish reach the spawning beds until the young ones begin their life in the ocean. In addition, there are now oceanographic and biological studies to determine what conditions effect salmon at sea.



### South Atlantic Exploratory Fishery Program

FLORIDA EAST COAST SURVEY FOR ROYAL-RED SHRIMP CONTINUED  
(M/V Combat Cruise 5): Additional production-type dragging for royal-red shrimp



M/V Combat September 1956 trip.

was carried out by the U. S. Fish and Wildlife Service-chartered shrimp trawler M/V Combat in 160-200 fathoms off St. Augustine, Fla., during August and September 1956. Nineteen drags made with 40-foot and 56-foot flat trawls during August 17-22 yielded a total of 3,305 pounds of heads-on royal-red shrimp (25-count headed). Individual catches ranged from 60-360 pounds and averaged approximately 170 pounds of shrimp a 3- to 5-hour drag. Lower catch rates were obtained in the same area between September 14-19 when 20 drags caught a total of 2,321 pounds of heads-on royal-red shrimp, averaging 115 pounds a drag. During the latter trip, seven drags were made south of the St. Augustine grounds in depths of 150 to 225 fathoms. Catches ranged from 40 to 80 pounds of royal-red shrimp a drag, with equal amounts of 21-25 count and 61-70 count heads-off shrimp in each successful drag.

A commercial shrimp vessel, the M/V Northeaster, working with the Service-chartered M/V Combat during the mid-September trip, landed approximately 1,800 pounds of headed royal-red shrimp.

The August 30-September 4 period was devoted to additional shallow-water exploration along the Florida coast north of Cape Canaveral. A total of 26 drags were made in depths of 13-18 fathoms and 5 in 100-150 fathoms, using 40-foot flat trawls and a 10-foot beam trawl. Although several isolated trawling areas were located, the bottom was found to be mostly coral and generally untrawlable out to the edge of the continental shelf. Drags in 22 to 23 fathoms using a 40-foot trawl caught large rock shrimp (*Sicyonia brevirostris*), at rates of 90 to 150 pounds an hour during night fishing.

While fishing at night during this period, several large schools of sardines (*Sardinella anchovia*) were observed and picked up on the depth recorders between the 10- and 40-fathom curves. Samples were obtained using a dip net.



### U. S. Fish Catch May Set All-Time Record in 1956

United States fishermen in Alaska may catch more than 5 billion pounds of fish in 1956 and set an all-time national record unless some unforeseen circumstance intervenes, Secretary of the Interior Fred A. Seaton announced on November 5, 1956.

U. S. Fish and Wildlife Service records indicate that about 70 percent of a year's catch is landed by September 1 and that this year the total landings are running nearly half a billion pounds ahead of those of last year and well ahead of the catch on September 1, 1941--the record year. Even if the catch in the final quarter is only normal the record will be broken, the Secretary explained.

In 1955 the total American catch was 4.9 billion pounds, which is the present record year.

Menhaden, a fish used primarily for oil and meal and usually comprising about 40 percent of the catch, is setting the pace with an increase of 200 million pounds. Other species which have been taken in considerably greater quantity than in 1955 are: tuna, up 60 million pounds; Alaska salmon, up 50 million; Alaska herring, up 39 million; California sardine, up 28 million; Maine sardine, up 26 million; Pacific jack mackerel, up 23 million; Pacific mackerel, up 9 million; ocean perch, up 6 million; haddock, up 10 million; halibut, up 7 million.

The ex-vessel value for the 1955 catch was \$325 million. Prices are somewhat better this year, which together with the larger catch indicates an increase in the ex-vessel value of the catch.



### United States Fishing Fleet<sup>1/</sup> Additions

**OCTOBER 1956:** A total of 49 fishing vessels of 5 net tons and over were issued first documents as fishing craft during October 1956, according to the U. S. Fish and Wildlife Service. This was 8 vessels more than the number reported for the same month last year.

A total of 454 fishing vessels was documented for the first time during the first

<sup>1/</sup>Includes both commercial fishing and sport fishing craft.

Table 1 - Vessels Issued First Documents as Fishing Craft, by Tonnage, October 1956

Net Tons	Number
5 to 9 .....	29
10 to 19 .....	9
20 to 29 .....	3
30 to 39 .....	8
Total .....	49

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Areas, October 1956 and Comparisons

Area	October		Jan.-Oct.		Total
	1956	1955	1956	1955	1955
	(Number)				
New England .....	1	1	14	17	18
Middle Atlantic .....	2	1	23	12	13
Chesapeake .....	22	10	109	44	54
South Atlantic .....	14	11	106	61	65
Gulf .....	6	15	89	92	103
Pacific .....	3	3	71	110	117
Great Lakes .....	-	-	2	7	9
Alaska .....	1	-	40	31	35
Hawaii .....	-	-	-	3	3
Virgin Islands .....	-	-	-	-	1
Total .....	49	41	454	377	418

Note: Vessels assigned to the various sections on the basis of their home port.

ten months of 1956--an increase of 77 craft (20 percent) more than the number reported for the corresponding period of last year. During the ten-month period of 1956, the Chesapeake led all other areas with 109 newly-documented vessels, followed by the South Atlantic area with 109.



## U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, AUGUST 1956: Imports of edible fresh, frozen, and processed fish and shellfish in August increased 5 percent in quantity and

Table 1 - United States Foreign Trade in Edible Fishery Products, August 1956 With Comparisons

Item	Quantity			Value		
	Aug.	Year	Aug.	Aug.	Year	Year
	1956	1955	1955	1956	1955	1955
Imports:	(Millions of Lbs.)			(Millions of \$)		
Fish & Shellfish:						
Fresh, frozen, & processed <sup>1/</sup> .....	74.6	71.1	769.9	22.3	18.6	206.4
Exports:						
Fish & Shellfish:						
Processed <sup>1/</sup> only (excluding fresh and frozen) .....	4.8	5.8	91.0	1.1	1.6	21.6

<sup>1/</sup> Includes pastes, sauces, clam chowder and juice, and other specialties.

1.8 percent in value as compared with July 1956. Compared with August 1955 the imports for August 1956 were higher by 5 percent in quantity and 20.0 percent in value. August 1956 imports averaged 29.9 cents a pound as compared with 26.2 cents a pound for the same month in 1955 because of the higher prices prevailing for many imported fishery products, particularly shrimp and spiny lobster tails.

Exports of edible processed fish and shellfish in August decreased 19 percent in quantity and 15 percent in value as compared with August 1956. Compared with August 1955 the imports for August 1956 were also lower by 17 percent in quantity and 31 percent in value.

\*\*\*\*\*

### GROUND FISH FILLETS IMPORTS REACH RECORD HIGH IN OCTOBER 1956:

A total of 25.7 million pounds of cod, haddock, hake, pollock, and ocean perch fillets, including fish blocks, were imported into the United States during October 1956--the highest ever recorded for any one month. This was an increase of 8.8 million pounds or 52 percent as compared with the same month of 1955. The increase was due primarily to increased imports from Canada (up 5.0 million pounds)



and from Iceland (up 3.1 million pounds). Imports from Norway and Denmark also were somewhat larger, while receipts from the Netherlands and West Germany were less than in October 1955.

Groundfish and ocean perch fillets imported from Canada during October 1956 amounted to 17.2 million pounds--67 percent of the total; Iceland accounted for 25 percent; and the remaining 8 percent came from Norway, Denmark, the United Kingdom, the Netherlands, France, West Germany, and Greenland.

Eleven countries exported 128.7 million pounds of groundfish and ocean perch fillets (including blocks and slabs) to the United States during the first 10 months of 1956, while twelve countries exported 114.6 million pounds of these products during the corresponding period of 1955. Canada (91.4 million pounds) led all other countries in exports of these items to the United States with 71 percent of the 10-month total. Iceland (26.6 million pounds) was in second place, followed by Norway (3.9 million pounds), Denmark (2.9 million pounds), and West Germany (1.9 million pounds).

Note: See Chart 7 in this issue.

\*\*\*\*\*

**TUNA CANNED IN BRINE IMPORTS UNDER QUOTA PROVISIO:** The quantity of tuna canned in brine which may be imported into the United States during April 16 through December 31, 1956, at the  $12\frac{1}{2}$ -percent rate of duty is limited to 28,757,393 pounds. Any imports in excess of that quantity will be dutiable at 25 percent ad valorem.

Imports under the quota from April 16-November 3, 1956, amounted to 22,489,317 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 6,268,076 pounds of the quota which may be imported in the last two months of 1956 at the  $12\frac{1}{2}$ -percent rate of duty.



### Wholesale Prices, October 1956

The major United States fisheries in October were entering a period of low yield--the West Coast halibut season ended; the season for canning salmon was about over; the canning season for Maine sardines continued, but at a low level; and the yield for some fresh-water fish was poor. On the other hand, the tuna catch continued at a high level; the New England haddock fishery was normal; Gulf shrimp production was good, but not up to expectations; and oyster harvesting was entering the period of peak production, but with indications of a below-average season. October 1956 wholesale prices were down slightly from September 1956, but were still higher than for the same month in 1955. The October 1956 wholesale index (112.5 percent of the 1947-49 average) for all edible fresh, frozen, and canned fish and shellfish declined about 1.6 percent from September, but was higher by 4.7 percent than for October 1955.

The leading finfish from a production standpoint in the drawn, dressed, and whole finfish subgroup were haddock and yellow pike, all the other varieties--salmon, halibut, lake trout, and whitefish--were relatively scarce in the fresh fish markets. This supply situation was reflected in the mixed trends in this subgroup with the net result that from September to October 1956 the subgroup index dropped 7.6 percent. When compared with October 1955, the October 1956 index for this subgroup was higher by 6 percent. Prices for most of the seven fish products in the drawn, dressed, and whole finfish subgroup were higher in October 1956 than in the same month in 1955.

The October 1956 index for the fresh processed fish and shellfish subgroup was only 0.7 percent lower than for the preceding month and higher by 15.2 percent than in October 1955. Higher prices in October 1956 for fresh headless shrimp at New York and fresh shucked oysters offset the lower prices for Boston haddock fillets.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, October 1956 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices <sup>1/</sup> (\$)		Indexes (1947-49=100)			
			Oct. 1956	Sept. 1956	Oct. 1956	Sept. 1956	Aug. 1956	Sept. 1955
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) . . . . .					112.5	114.3	114.6	107.4
<u>Fresh &amp; Frozen Fishery Products:</u> . . . . .					122.0	125.8	126.5	110.1
<u>Drawn, Dressed, or Whole Finfish:</u> . . . . .					122.5	132.6	131.2	115.6
Haddock, lge., offshore, drawn, fresh . . . . .	Boston	lb.	.07	.10	67.4	100.1	101.3	106.3
Halibut, West., 20/80 lbs., drsd., fresh or froz. . . . .	New York	lb.	.43	.45	135.5	139.2	136.9	99.3
Salmon, king, lge. & med., drsd., fresh or froz. . . . .	New York	lb.	.67	.68	150.6	151.7	148.3	135.1
Whitefish, L. Superior, drawn, fresh . . . . .	Chicago	lb.	.75	.61	185.9	151.2	121.5	161.1
Whitefish, L. Erie pound or gill net, rnd., fresh . . . . .	New York	lb.	.80	.74	161.8	149.6	131.4	161.7
Lake trout, domestic, No. 1, drawn, fresh . . . . .	Chicago	lb.	.75	.58	153.6	117.8	122.9	116.8
Yellow pike, L. Michigan & Huron, rnd., fresh . . . . .	New York	lb.	.36	.50	83.3	117.3	129.0	75.1
<u>Processed, Fresh (Fish &amp; Shellfish):</u> . . . . .					125.4	126.3	122.2	108.9
Fillets, haddock, sml., skins on, 20-lb. tins . . . . .	Boston	lb.	.27	.29	91.9	97.0	97.0	102.1
Shrimp, lge. (26-30 count), headless, fresh . . . . .	New York	lb.	.71	.72	112.2	113.0	110.2	87.1
Oysters, shucked, standards . . . . .	Norfolk	gal.	6.00	6.00	148.5	148.5	142.3	136.1
<u>Processed, Frozen (Fish &amp; Shellfish):</u> . . . . .					106.2	102.9	114.5	93.3
Fillets: Flounder, skinless, 1-lb. pkg. . . . .	Boston	lb.	.39	.40	102.1	103.4	103.4	102.1
Haddock, sml., skins on, 1-lb. pkg. . . . .	Boston	lb.	.28	.28	86.3	86.3	86.3	84.7
Ocean perch, skins on, 1-lb. pkg. . . . .	Boston	lb.	.27	.28	108.8	110.8	110.8	106.7
Shrimp, lge. (26-30 count), 5-lb. pkg. . . . .	Chicago	lb.	.69	.64	105.7	99.2	120.4	83.3
<u>Canned Fishery Products:</u> . . . . .					99.0	98.0	97.7	103.4
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . . . .	Seattle	cs.	22.65	22.65	122.0	120.0	120.0	114.8
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs. . . . .	Los Angeles	cs.	10.85	10.60	78.2	76.4	76.4	92.3
Sardines, Calif., tom, pack, No. 1 oval (15 oz.), 48 cans/cs. . . . .	Los Angeles	cs.	7.75	7.50	90.4	87.5	87.5	88.1
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs. . . . .	New York	cs.	7.70	7.70	81.9	81.9	79.8	87.3

<sup>1/</sup>Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Wholesale prices for fresh shrimp at New York City were up about 9 percent from October 1955 to October 1956, but haddock fillet prices at Boston were down 10 percent over the same period.

Wholesale prices for processed frozen shrimp in October were directly opposite to the seasonal trend. As a rule frozen shrimp prices drop in the fall months, but this October they rose because of (1) below-normal landings in the Gulf, (2) relatively low stocks, and (3) the steady demand for this commodity during periods of high wage levels. Frozen fillet prices in October 1956 were down slightly from the previous month, but still were higher than for October 1955. The frozen processed fish and shellfish subgroup index for October 1956 was 3.2 percent above the previous month and 12.1 percent above the same month in 1955.

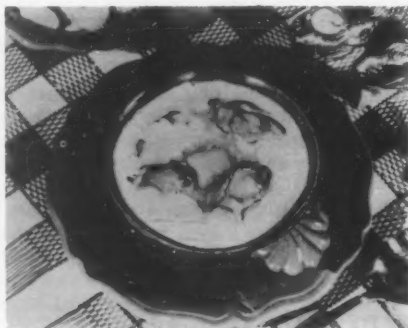
The index for the canned fish subgroup continued to show signs of firmness in October 1956 when compared with both September and August 1956. Although still below the October 1955 index by 4.3 percent, the price gap between the two years

is closing. The drop in canned tuna prices was reversed with an increase in October of 25 cents a case for the chunk-style light-meat pack. Although the California sardine fishing season was off to a good start, early indications of a fair season did not continue up to the end of October and as a result canned California sardine (pilchard) prices moved upward. The marketing situation for all canned fish was very healthy at the end of October 1956.



### NOW IS THE TIME FOR OYSTER STEW

Now is the time to serve a tempting bowl of steaming hot oyster stew. This dish will have special appeal to all and it is so easy to prepare.



Oysters are entirely edible and there is no waste from trimmings. And nutritionally speaking, they are wonderful! An average serving of six oysters will supply more than the daily allowance of iron and copper, about one-half the iodine, and about one-tenth of the needed protein, calcium, magnesium, phosphorus, vitamin A, thiamine, riboflavin, and niacin. To retain the delicate, distinctive flavor of oysters, never cook them too long, just enough to heat them through and leave them plump and tender.

Oyster stew served in a large bowl accompanied by crisp crackers, a jellied fruit salad, and a home baked cake will form the basis for an attractive, delectable, nutritious meal. Here is a recipe for "Oyster Stew" as recommended by the home economists of the U. S. Fish and Wildlife Service to serve your family on chilly days.

#### OYSTER STEW

1 PINT OYSTERS	1 ½ TEASPOONS SALT
¼ CUP BUTTER OR MARGARINE, MELTED	DASH PEPPER
1 QUART MILK	PAPRIKA

DRAIN OYSTERS. ADD OYSTERS TO BUTTER AND COOK FOR 3 MINUTES OR UNTIL EDGES CURL. ADD MILK, SALT, AND PEPPER, AND BRING ALMOST TO BOILING POINT. GARNISH WITH PAPRIKA. SERVES 6.



## International

### AIR CARGO PERISHABLE FOODS PACKAGES TO HAVE DISTINCTIVE LABEL

New symbolic labels are appearing on various types of international air cargo packages, according to the International Air Transport Association (IATA).

Each of the new labels is designed to convey its message at a glance. The "Perishable Goods" label is wordless, except that the name of the airplane employing it appears below the diagram.

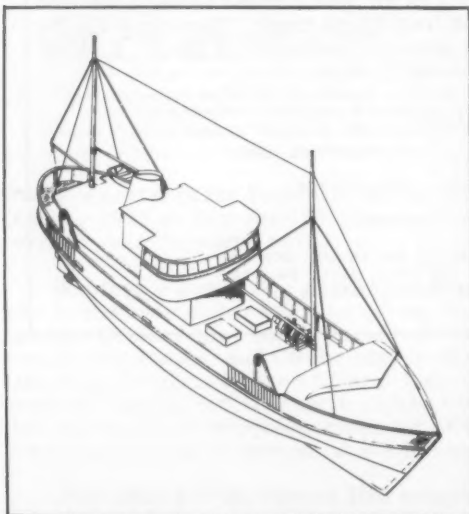
The perishable goods label exhibits a completely new approach to the problem of symbolizing on a package such commodities as meat, fish, fruit or flowers. The illustration shows a carcass of beef, a cluster of grapes, a fish, and a flower, in four separate diagrams surrounding the outline of an hourglass. The symbols are in blue on a white background.

The result of studies by cargo and traffic experts of IATA's traffic handling and accountancy working group, the labels have minimum dimensions, 4 inches wide by 6 inches high.

## FOOD AND AGRICULTURE ORGANIZATION

### FISHERY RESEARCH VESSELS DESIGNED BY FAO NAVAL ARCHITECTS:

Outline plans and specifications for a 90-foot fishing gear research vessel, which will cost about US\$240,000, have been prepared by naval architects of the Food and Agriculture Organization Rome, for the Government of Sweden.



Line drawing of proposed Swedish fishery research vessel prepared by Naval Architects of FAO.

These drawings, which have been prepared after special study of the requirements of a gear research vessel, will provide the base from which Swedish naval architects will make final working drawings.

"This is one of many research vessels which we have advised or worked on recently," said Jan Olof Traung, Chief, Fishing Boat Section, Technology Branch, Fisheries Division, FAO. The Government of South Africa is now considering building three fishery research vessels at a total cost of about US\$490,000 and have requested FAO to advise them on layout, design, and specifications. The vessels concerned are two of 75 feet and one of 100 feet.

FAO plans for the Swedish fishery research vessel call for wooden construction

but a modified hull shape which will give higher speed and make for a more "sea-kindly" vessel.

"We hope that this vessel, when built, will provide a useful example in design for Swedish fishermen," stated Traung. "We have given the boat a sharper entrance, fuller midships section, and a fuller run, and I think its performance will encourage Swedish fishermen to adopt this type of design."

An unusual feature of the vessel is an alleyway which runs through the center of the large fish hold. This will enable the crew and the scientists on board to walk from one end of the ship to the other under cover and will permit separate experiments to be conducted in each half of the fish hold, especially in connection with the use of antibiotics to preserve fish. Another feature is that the trawl winch is hydraulically driven and has therefore been placed forward on the port side, which was considered best from the fishing point of view.

While research vessels are essential for development and progress in fisheries, the cost is very heavy as compared, for example, with the cost for constructing laboratories ashore.

"We know that a great many countries are interested in building fishery research vessels," said Traung, "and a good deal of thought should be given to the actual boat requirements within their research programs. Research vessels have to be built for specific purposes, such as gear research or biology, fundamental or applied. If the work to be done is exactly defined then it might be possible to use smaller ships to better advantage. For example, two 90-foot vessels might be more efficient and useful in fishery research than one of 120 feet and yet cost no more.

"We are investigating this situation at FAO and we are preparing preliminary plans and specifications for 12 fishery research vessels, three each of 30 feet, 50 feet, 70 feet, and 90 feet, respectively," he stated. "When we have these outline designs ready, they will form a kind of catalogue of research vessels which will enable us to show governments what can be achieved with such smaller ships."

#### INTERNATIONAL COUNCIL FOR EXPLORATION OF THE SEA

INTERNATIONAL COOPERATION RECOMMENDED TO CONSERVE NORTH SEA HERRING STOCK: The International Council for the Exploration of the Sea during its annual meeting at Copenhagen, that ended on October 9, 1956, expressed concern over the herring stocks in the southern part of the North Sea. Exports from 15 countries, including Russia, who attended the meeting, now have a clearer picture, as a result of research, of the status of North Sea herring stocks.

A committee passed a resolution urging all interested countries to cooperate in a coordinated program designed to determine factors affecting the yield from North Sea herring fisheries.

The committee said herring seem to be changing their migration patterns. Some experts think the large number of young herring caught by Danish and German fishermen is reducing the English fishery off Yarmouth and Lowestoft. There was urgent need for intensification of the tagging program, under which about one-million herring have been marked by nylon, wire, or pellets over the past eight years.

Prof. H. U. Sverdrup, of Norway, president of the council, said the results might indicate that the herring fishery should be limited, but this need not mean that yields had to fall--only that stocks should be fished in a more rational way.

The investigating committee recommended that international cooperation could best be started by an intensive tagging program on the Bloeden ground, beginning in August 1957. (The Fishing News, October 12, 1956.)



Reduced herring catches in the North Sea are due, not to overfishing, but to changes in the migration of the herring, according to the fishery experts who attended the annual meeting.

Dr. Arni Fridriksson, secretary-general of the Council, said distribution of herring depended on such factors as availability of food, ocean currents, water salinity, and temperature.

In his own studies of the North Iceland herring fishery, which has failed for the past 11 years, he found that the most important reason seemed to be a change in ocean currents which had become too strong to take the herring together with the food on which they live, to the North Sea. These in turn were connected with changes towards a milder climate.

The herring which were deserting their normal fishing banks were possibly either not concentrating in such large shoals, or were frequenting other banks which were unknown, he said.

As yet, however, there was inadequate evidence to put forward any satisfactory scientific explanations, said Dr. Fridriksson.

#### INTERNATIONAL NORTH PACIFIC FISHERIES COMMISSION

##### FIVE MONTH SURVEY OF NORTH PACIFIC SALMON STOCKS COMPLETED:

A five-month study by Canadian, Japanese, and United States biologists to discover the salmon's North Pacific Ocean habitats and whether or not United States and Canadian salmon overlap with Asiatic salmon was completed in October 1956. The survey was made by the chartered fishing vessels Challenger and Key West II.

During the course of the survey mile-long gill nets with four different mesh sizes were set between 42° and 58° north latitude and as far west as longitude 150°. The vessels were equipped with freezing systems for preserving the catch for further study at Canada's Biological Station at Nanaimo, B. C. Scientists collected water temperatures, water samples down to 150 fathoms, plankton, and other oceanographic data. Fish were caught at all stations. The two vessels traveled 16,000 miles during their investigations.

#### INTERNATIONAL PACIFIC SALMON CONFERENCE

##### CANADA-UNITED STATES AGREEMENT ON PINK SALMON CONSERVATION:

Agreement was reached today by Canadian and United States delegates at a Conference called to work out means for coordinating national and joint conservation programs for pink and sockeye salmon of common concern in the Juan de Fuca-Fraser River area of the Pacific Coast. The Conference agreed that this objective might best be achieved by expanding the authority of the International Pacific Salmon Fisheries Commission, by amendment of the Sockeye Salmon Convention of 1930, thus permitting the Commission to investigate the pink salmon stocks of the Fraser River and regulate the fishery.

The Commission's objective would be to maintain the pink salmon stocks at the level of maximum sustainable productivity and to insure insofar as practicable an equal division of the catch of pinks by Canadian and United States fishermen. The agreement provides that the Commission may begin regulation of the fishery immediately after entering into force.

The International Pacific Salmon Fisheries Commission which was established in 1937 consists of three representatives each from Canada and the United States. It has had responsibility for the investigation and management of the sockeye salmon of the Fraser River system, states an October 25, 1956, news release from Canada's Department of Fisheries in Ottawa.

The agreement will provide for division of the catch and will increase the size of the Commission's Advisory Committee by adding one member from each country in order to give broader representation from the industry.

The agreement also provides for a coordinated investigation by research agencies of the two governments and the commission of pink salmon stocks which enter the waters described in the convention. It calls for a meeting in the seventh year after entry into force to review the results of this investigation and to determine what future arrangements concerning pink salmon conservation might be desirable. The agreement has been referred to the two governments for signature.

The conference also took note of the serious threat which offshore net fishing poses to the conservation of both pink and sockeye salmon stocks and adopted a resolution calling this matter to the attention of the governments and recommending immediate action on their parts to solve the problem.

The conference opened under the chairmanship of George R. Clark, Deputy Minister of Fisheries of Canada and head of the Canadian delegation. Vice-chairman was W. C. Herrington of the Department of State, Washington, D. C., who headed the United States delegation. Representatives of the governments of both countries, the Department of Fisheries of the State of Washington, and of fishermen, fish processors, and vessel owners from the State of Washington and British Columbia took part in the discussions.

#### AGREEMENTS

**SOVIET-IRAN FISHERIES AGREEMENT:** Iran and the U. S. S. R. signed a fisheries agreement (covering the period March 1956 to March 1957) on June 5, 1956, providing for the sale to Russia of about 46 metric tons of caviar, 500 metric tons of sturgeon, and 700 metric tons of other types of Caspian Sea fish. The agreement, which is valued at about \$797,000, differs only slightly from the previous year's. First deliveries under the agreement will come from catches of the 1956 fishing season which began in September 1956. The Iranian-Soviet barter trade agreement for 1956/57, to which the fisheries agreement is related, provides a maximum quota of about \$855,000 in fish and fish products for export to the U. S. S. R.

The amount of caviar, sturgeon, and miscellaneous other fish which is to be sold to the Soviet Union is the same as that agreed upon last year, but prices have been increased in two instances: first-grade beluga caviar has risen from US\$18 to US\$20 a kilogram (\$8.16 to \$9.07 a pound), and sturgeon is quoted at US\$336 a metric ton instead of US\$317. Following are the quantities, grades, and prices of caviar to be sold:

Metric Tons	Caviar Type and Grade	US\$ Per Pound
3	Beluga, 1st	9.07
7	Ossatrina, 1st	8.16
1	Ossatrina, 2nd	4.08
15	Sevruga, 1st	5.73
8	Sevruga, 2nd	2.86
8	Pressed, 1st	2.61
4	Pressed, 2nd	1.96

The sale of about \$497,580 in assorted grades of caviar is thus foreseen by the agreement, states an October 5, 1956, despatch from the United States Embassy in Tehran. The 500 metric tons of sturgeon are valued at about \$168,000, while the third category of about 700 metric tons of miscellaneous Caspian Sea fish may come to about \$131,000. These prices include delivery from the Iranian port of Bandar Pahlevi on the Caspian to the Soviet port of Baku. If sufficient Iranian shipping is not available,

the U. S. S. R. is obligated under the agreement to furnish the necessary transportation for what was described by the managing director of the National Iranian Fisheries Company as a "very small" fee. It is moreover anticipated that the U. S. S. R. will have to furnish most of the transportation this year.

During the life of the contract for 1955/56, the U. S. S. R. took the entire amount allocated in the agreement. The same is expected this year, with the possibility, according to a fisheries official, that more than the allotted 700 metric tons of miscellaneous fish will be taken.

This fisheries agreement is made within the frame of the Iran-U. S. S. R. barter agreement, signed September 5, 1956, for the period April 1, 1956-March 31, 1957. The maximum export quota for Iranian fish and fish products under the barter agreement is 65,000,000 rials (about US\$855,000). The quota amount the previous year was 60,000,000 rials (US\$789,000). Fishing equipment from the U. S. S. R. will partly offset the value of Iranian fisheries products. The maximum quota set for Soviet fishing equipment and nets under the barter agreement is 15,000,000 rials or about US\$144,000, the same as last year. It is believed that the equipment will include, in addition to nets, fishing boat gear, fish processing chemicals, and tins for fish canning.

\* \* \* \* \*

#### SOVIET-JAPANESE PEACE AGREEMENT ACTIVATES FISHING TREATY:

Japan and the Soviet Union on October 19, 1956, in Moscow, signed an agreement to end 11 years of a state of war between them. While the agreement was not a formal treaty of peace, it was a resumption of diplomatic relations and settled most of the problems that had existed between the two countries since World War II with the exception of territorial problems.

One result of this action was to make effective the Japanese-Russian treaty of May 14, 1956, regarding fishing in the Northwest Pacific. Essentially, the May 14 treaty establishes a joint Russian-Japanese commission to review operation of the pack, set annual catch limits, and recommend measures to conserve and increase the marine resources of the contested area.

Included in the texts of of the Joint Declaration by Japan and the Union of Soviet Socialist Republics included these paragraphs regarding fisheries:

8. The Convention between Japan and the Union of Soviet Socialist Republics concerning the Fisheries in the High Seas of the Northwest Pacific Ocean and the Agreement between Japan and the Union of Soviet Socialist Republics concerning Cooperation for the Rescue of Persons in Distress at Sea, which were signed in Moscow on May 14, 1956, shall become effective simultaneously with the entry into force of the present Declaration.

Japan and the Union of Soviet Socialist Republics shall in a spirit of cooperation take measures for the conservation and development of fishery resources as well as for the regulation and restriction of fishing in the high seas, taking into consideration the interests of Japan and the Union of Soviet Socialist Republics with regard to the conservation and rational utilization of the fish and other living resources of the sea.

#### WHALING

EXPEDITIONS FOR 1956/57: During the 1956/57 Antarctic whaling season, 20 expeditions will participate as compared with the 19 that took part in the 1955/56 season. The additional expedition will be from Japan, making a total of five from that nation. Norway will have 9 expeditions and the balance will come from England, South Africa, Russia, and the Netherlands.

The 20 factory whaling ships and three shore stations will use 35 fewer catcher boats, 243 as compared with 278 in 1955/56. This is in accord with the agreement

made by the whaling companies at the suggestion of the Norwegians in an effort to reduce costs (The Fishing News, October 12, 1956).

This season the catch is to be limited to 14,500 blue-whale units--one blue whale (the largest species, growing up to 100 feet long) equals two fin (the next largest) or  $2\frac{1}{2}$  humpback, or six sei. Last season the limit was 15,000 units.

There are many other restrictions, of which the main two are:

The season as a whole lasts only from January 7 to April 7, and is ended earlier if the catch limit is reached before the closing date. There is no extension if the limit is not reached. Blue whales can only be killed from February 1, and only four days are allowed for humpbacks.

Blue whales must not be killed under 70 feet long, fin whales 55 feet, sei whales 40 feet, and humpback 35 feet.

\* \* \* \* \*

JOINT JAPANESE-CHILEAN WHALING VENTURE PLANNED: A joint whaling company has been planned by a leading Japanese fishing firm and a newly incorporated Chilean firm. Under the plan the proposed company will have a capital of US\$1.2 million, which will be shared equally by the participating companies. The Japanese will provide two whaling catcher boats with crews of forty men. They also will furnish 16 technicians to operate the proposed plant which will be located at Coronel Bay, near Concepcion, in Chile.

The Japanese Ministry of Foreign Affairs had earlier opposed the agreement on the grounds that the firm would not be subject to the provisions and restrictions on whaling imposed by the International Whaling Commission since it will be organized under Chilean Law. Chile is not a member, but Japan is a member of the Commission and is bound to abide by its rules. The Ministry withdrew its objections recently on receipt of assurance from the Japanese and Chilean firms that the new company will observe the International Whaling Commission's regulations. Officials of the Japanese firm in Tokyo have stated that with the withdrawal of the Ministry of Foreign Affairs objections the agreement will be approved by the Japanese Government. They also state that Chilean Government approval of the arrangement is imminent, states an October 12, 1956, dispatch from the United States Embassy in Tokyo.

The Japanese fishing industry attaches considerable importance to this venture since it is the largest of its kind ever attempted by a Japanese fishing firm and the industry hopes that it will set a pattern for such arrangements in other countries which would relieve the pressures on Japanese coastal fishing and whaling.



### Argentine Republic

CANNED SARDINE MARKET: Argentina produces an "Argentine sardine" from a local catch of anchovitas (*Clupea* or *Engraulis encrasicolus*). In 1955, there were landings of 336,419 boxes (averaging 40 kilograms or 88 pounds each in weight) of fresh anchovita. Of this quantity, 190,271 boxes went to the sardine canneries.

The leading canner calculates 1955 output of canned Argentine sardines at approximately 500,000 cases--100 cans to a case for cans of 115-170 grams (4-6 oz.); 50 cans to a case for cans of 220 grams (about 8 oz.) and up. The bulk is packed in vegetable oil and a few in olive oil, and tomato sauce.

Domestic production of canned Argentine sardines adequately covers local requirements and can readily be increased, an October 22 dispatch from the United States Embassy at Buenos Aires states. From the 1955 production, industry carried over a stock of 10 percent or more. The long-range consumption trend is upward, but at the moment sales have declined because of relative higher price increases for canned goods since the October 1955 devaluation.

Table 1 - Argentine Packers' Prices for Canned Sardines to Retail Distributors, October 15, 1956

	Vegetable Oil		Olive Oil	
	Pesos	U. S. Cents	Pesos	U. S. Cents
115-120 grams (4-5 oz.) .....	2.78	16	3.95	22
170-180 grams (6-7 oz.) .....	3.55	20	4.95	28
220 grams (about 8 oz.) .....	4.70	26	6.50	36

For wholesalers, the packer grants a discount varying from 10 to 15 percent.

Imports of canned sardines are not authorized by Argentina.



### Australia

**PEARL SHELL BEDS TO BE SURVEYED:** The Australian Minister for Primary Industry announced that it has become necessary to establish the condition of the pearl-shell beds located off Northern Australia after years of pearling operations by Australian and Japanese fleets. The results of the survey will provide a guide to future pearling activities. The survey will be carried out by the Commonwealth Fisheries Division of the Department of Primary Industry in collaboration with the Commonwealth Scientific and Industrial Research Organization, and is expected to take about six months.

The Japanese pearling and fishing operations carried out off Australia have long been a most controversial subject in Australia and annual agreements regulate the areas to be fished and the amounts of pearl to be taken by the Japanese. Australia claims the right to control pearl fishing in the relatively shallow waters of the continental shelf located off the northern coast. This claim is the subject of an Australian-Japanese dispute which may be brought before the International Court of Justice, states an October 22, 1956, dispatch from the United States Embassy in Canberra.

\* \* \* \* \*

**SCALLOP RESOURCE FOUND OFF QUEENSLAND:** Scallops have been found in great numbers along some parts of the Queensland coast of Australia, reports the Australian Department of the Interior.

The Queensland scallop is similar in size and appearance to the Japanese variety. The upper shell is a dark golden color and the lower is pale like the color of a full moon. For that reason it is sometimes referred to as the "sun and moon" fish.

Until recently, the only commercially-established scallop beds have been in the coastal waters of the State of Tasmania, although these shellfish were known to exist around the southern Australian coastline from New South Wales to Western Australia.

But in 1954, shoals of scallops were discovered in Queensland. A fisherman trawling for shrimp brought to light quantities of scallops in Platypus Bay, near



Bundaberg. The following year another fisherman operating with an echo-sounder found appreciable quantities of scallops in Hervey Bay and picked up two tons in 10 minutes.

Since then a Hervey Bay trawling company apart from helping to supply Queensland shrimp to newly-established markets in the United States, New Zealand, and the United Kingdom, has concentrated on exploring the possibilities of establishing a market for Queensland scallops both locally and overseas.

The Queensland Scallop, which averages six inches in diameter, is much larger than its Tasmanian cousin. The first experimental trawling undertaken by the Hervey Bay company in April 1956 resulted in a catch of 20 tons (in the shell) of scallops in six trips. Since then the scallop fishing has been intensified to increase the supply of scallops for an expanding local market.

And now that the first order for 7,200 pounds from the United States has been followed by a second of 37,100 pounds, it seems inevitable that scallops will take their place beside shrimp as Queensland's newest export industry.

Scallops are caught by draggers in much the same way as shrimp. Their natural enemy is the starfish and with every net full of scallops hauled aboard the trawler there is invariably a large following of starfish.

The scallop meats are packed in transparent plastic bags, packaged in attractive cartons, and deep-frozen ready for delivery to home and overseas markets.

From the point of view of the fishermen who man the 80-odd trawlers operating from Bundaberg, the scallop promises to bring stabilization to the fishing industry for unlike shrimp which disappear from about October until May, scallops are found all year round.



### Bahama Islands

**SPONGE BEDS TO BE OPENED APRIL-JUNE 1957:** The Agricultural and Marine Board of the Bahama Islands announced early in October that it plans to open the sponge beds in the Bahamas from April 1 to June 30, 1957. The Board was reported to be looking for a large shed near the harbor of Nassau which can be used as a market, states an October 5 dispatch from the United States Consul in Nassau.



### Belgium

**CANNED SARDINE MARKET:** The domestic pack of canned sardines or sprats (4 packing firms) or pilchards in Belgium during 1955 is estimated at 162.1 metric tons as compared with 71.6 tons in 1954, according to a United States Embassy dispatch (September 26) from Brussels. In 1953 the pack totaled 50.5 tons and in 1952 amounted to 90.6 tons. Only 5 percent of the domestic production, which is produced by four canners of medium importance, is consumed locally. There is no production of canned "true sardines" in Belgium.

Foreign trade statistics (which cover the Belgium-Luxembourg Economic Union (BLEU) indicate that 5,936 tons of canned sardines and pilchards were imported in 1955, with the majority from Portugal (3,411 tons) and Japan (1,214 tons). Imports from the United States consisted of 927 tons of pilchards or California sardines.

Belgium consumption of canned sardines and pilchards appears to be increasing slowly and irregularly. The middle and low income groups are the chief consumers.

Table 1 - Belgium-Luxembourg Economic Union (BLEU) Estimated Consumption of Canned Sardines and Pilchards, 1952-55

Year	Imports	Estimated Consumption from Domestic Production	Estimated Total Consumption
		(Metric Tons).....	
1955	5,936	8	5,944
1954	6,005	4	6,009
1953	4,997	3	5,000
1952	4,605	5	4,610

About 50 percent of the consumers buy the  $4\frac{3}{4}$ -oz. oblongs, 30 percent the 3-oz. oblongs, 15 percent the 5-oz. flats, and 5 percent the 8-oz. and 16-oz. tall cans.

Table 2 - Source of Canned Sardine and Pilchard Imports by the Belgium-Luxembourg Economic Union, 1955

Country of Origin	Quantity (Metric Tons)
Portugal .....	3,411
Japan .....	1,214
United States ..	927
Yugoslavia .....	228
Netherlands ....	51
Others .....	105
Total .....	5,936

1/ All pilchards

Seventy-five percent of the consumers prefer sardines packed in olive oil; 20 percent, vegetable oil; and 5 percent, tomato sauce. Other packing mediums such as mustard sauce and brine are not consumed in Belgium.

The retail market price of the  $4\frac{3}{4}$ -oz. oblong can of sardines, packed in olive oil, ranges from 8.50-8.80 francs (17-18 U.S. cents) a can; in vegetable oil, 8.00-8.30 francs (16-17 cents); and in tomato sauce, 9.30 francs (19 cents). These are current retail prices for the most popular size; prices for other sizes are reported to be proportionate.

According to a well-established local firm which imports large quantities of canned fish from the United States, there is little likelihood that the Belgian market for United States "true sardines" can be developed, because sardines imported from the United States do not suit Belgian tastes. On the other hand, a market does exist for pilchards imported from the United States.

Sardines are generally imported by regular canned fish importers and sold to wholesalers who in turn distribute the goods to retailers.



## Brazil

**FOREIGN FISHING VESSELS UNDER CONTRACT TO FISH IN BRAZILIAN WATERS:** The Brazilian Government has authorized 30 Spanish, Italian, and Japanese fishing vessels to operate in Brazilian waters on a contract basis, according to the October 27, 1956, issue of (Canada) Foreign Trade.

The licensing of these foreign fishing vessels was made to meet the increased demands for fish. The Brazilian Ministries of Navy and Agriculture will organize the fishing industry and grant subcontracts to private firms. One of the requirements is that each crew must include a marine biologist. The plan provides for foreign crews at first, but it is intended that Brazilians will gradually replace the foreign crewmen.

\*\*\*\*\*

JAPANESE FISHING VESSEL SUPPLIES TUNA TO CITY OF RECIFE: In August-September 1956 the Japanese fishing vessel Kaiko Maru was supplying the Brazilian city of Recife with tuna steaks at the relatively low price of about 20 U. S. cents a pound, thus alleviating one of Recife's chronic food problems. The vessel, with the most modern equipment and a capacity of about 150 tons, belongs to a Japanese fishing company, and was authorized by the Brazilian Government to fish along the northeast coast of Brazil and sell its catch to Recife and other cities.

Despite being a coastal city, Recife is faced with the chronic problem of securing enough fish to supply its population of nearly 750,000. A relatively small supply of fish is provided daily by the fishermen of the raftlike "jangadas"; these catches are sold on the beaches in the evening when the fishermen return from all day at sea; and although this source is grossly inadequate for a city as large as Recife, it is the only constant supply of fish. Consequently, for Recife fish is a relatively high-priced food. During Lent 1956, special action was taken by the Mayor to charter a fishing boat to assure a plentiful supply of fish for the religious holidays. Besides having access to no regularly scheduled fishing boats, Recife's refrigeration facilities are extremely limited, so that fish must be sold quickly before they spoil.

In August 1956 the Kaiko Maru began to make marine studies and soundings of the Northeast Coast to determine the existence of fish in northeastern waters and the possibilities of exporting it from Recife. The Kaiko Maru was successful on its first fishing venture and came to the Port of Recife on August 8 with a full load of fine tuna. Through the intercession of the Governor, a provisory license was secured from the Federal Government for the Kaiko Maru to sell its product in Recife. Frozen boneless tuna steaks were sold to distributors for Cr\$23 per kilo (16 U. S. cents a pound), well under the market price, which were resold to the public at Cr\$30 a kilo (20 U. S. cents a pound). Another 150 tons were likewise quickly disposed of four weeks later.

On September 25, shortly before the Kaiko Maru was scheduled to deliver its third load of tuna to Recife, the National Ministry of Marine in Rio de Janeiro sent a telegram to the Captain of the Port of Recife, advising that the Japanese ship was authorized only to continue its studies of the Northeast Coast, to enter and leave the Port of Recife, but not to engage in commercial transactions.

When news of the telegram reached the press and the general public on September 27, it "..... exploded like a veritable bomb in the midst of the people" (Diario de Pernambuco, September 27). All papers carried the story. Public indignation was aroused to such a pitch that the matter even came to the attention of the State Assembly and the Governor. With so much public pressure generated against the cancellation order, including many telegrams of protest sent to Rio, the order was revoked two days later, according to an October 11 report from the United States Consul in Recife.



## Canada

BRITISH COLUMBIA HERRING FISHERY OUTLOOK FOR 1956/57: British Columbia's 1956/57 herring fishery is not expected to produce a total catch on a par with the record 250,000 metric tons taken in coastal waters the previous year. Catch predictions, made at the Fisheries Research Board station at Nanaimo, indicate a decrease in abundance in many areas which, last year, were high producers.

In a forecast, based on the size of catches, availability and spawning escapement in 1955/56 and on expected recruitment in 1956/57, the station states what might be reasonably anticipated in the forthcoming herring fishing season.

Lower east coast subdistrict, recognized as the main producing area of the coast, is expected to yield its normal quota of 40,000 tons although there are indications that abundance here may be slightly lower than in 1955, the September 1956 Trade News of the Canadian Department of Fisheries states.

In the Burnaby Narrows area of the Queen Charlotte Islands, where heavy fishing took place in the winter half of the herring fishing season, a decrease in the level of abundance is expected, and the catch is not likely to be as good as last season.

Some improvement is expected in the northern subdistrict, although it is thought unlikely that the quota will be exceeded. In the central subdistrict a catch of less than the 40,000-ton quota is predicted, unless the 1954 year-class proves to be of greater abundance than estimated.

Regular winter fishing in the upper east coast subdistrict may also be below average unless a large proportion of summer herring from Queen Charlotte Sound are of upper east coast origin.

Some decrease in abundance is anticipated in the middle east coast subdistrict, but the area still is expected to yield double the amount of its normal 10,000-ton quota.

Herring fishing off the lower west coast of Vancouver Island will be much the same as last season. In the Barkley Sound area a catch at least as good as last year is forecast. Little improvement can be expected from the Clayoquot area.

Improved fishing and fair catches may feature herring operations in the Esplanza-Nootka area, provided fish move inshore before the close of the season. In the balance of the area northwards it is predicted that results will remain below average.

\*\*\*\*\*

FISH INSPECTION ACT REVISED: Canadian importations of fish and shellfish other than canned need no longer be accompanied by an affidavit, according to the revised Fish Inspection Act regulations. Such importations, however, are still subject to inspection by an inspection officer of the Department of Fisheries, states a November 6, 1956, dispatch from the United States Embassy in Ottawa.

Entry may be permitted of shipments of fish and shellfish other than canned, and any duty applicable is to be collected. However, the fish inspection officer will be responsible for authorizing release and delivery of the shipments, or their detention if necessary.

The Customs Division of Canada's Department of National Revenue, in Memorandum Series D No. 135, dated October 30, 1956, published revisions in the Fish Inspection Act and the places throughout Canada where fish inspection offices are located.

\*\*\*\*\*

FISHERY SCIENTISTS PREDICT DISAPPEARANCE OF WEST GREENLAND COD: The disappearance of the cod fisheries from Greenland's west coast was predicted by scientists of the Canadian Fisheries Research Board during a conference of fishery scientists at St. Andrew, New Brunswick. A long range forecast of decreasing water temperatures for the Northwest Atlantic Ocean was made by Dr. Hugh McLellan, an oceanographer, who also said that with the downward

trend in water temperatures in future years a decrease in haddock landings relative to cod landings might be expected.

Dr. W. R. Martin, of the biological station at St. Andrews, said with the disappearance of the cod fisheries from Greenland's west coast there would be an associated increase in fishing intensity on the fishing banks off Nova Scotia and Newfoundland (The Fishing News, October 5, 1956).



### Ecuador

**SHRIMP INDUSTRY ELIGIBLE FOR LOANS:** The National Development Bank of Ecuador announced that loans will be made available to shrimp companies through branches established in coastal provinces. The bank pointed out the growing importance of shrimp exports as a source of dollars, states an October 11 dispatch from the United States Embassy in Quito.

Some observers have commented that official circles seem more favorable to the shrimp industry than they were previously. However, the announcement of the Bank's desire to assist the shrimp industry may mean little in practice as the Bank's funds are limited and demands for loans are greater than the Bank can meet.



### El Salvador

**FISHING COMPANY'S LICENSE SUSPENDED:** One of the few concerns fishing Salvadoran waters under the 1955 Fisheries Development Law had its license suspended by the El Salvador Ministry of Economy, which reasoned that: (1) said law provides that firms granted licenses should give preference to the internal market in selling their catch and (2) it has (allegedly) been established that the firm has limited its activities to catching shrimp for export, while disregarding other species for internal consumption.

This suspension is to remain in effect until the firm establishes or guarantees that it has set up an adequate distribution and sales system to supply internal consumption needs with corroboration as to the quantities distributed daily for this purpose. This is the first such disciplinary measure taken to enforce a provision of the fishing law, states a September 24 dispatch from the United States Embassy in San Salvador.

\*\*\*\*\*

**REGULATIONS IMPLEMENTING FISHERIES DEVELOPMENT LAW PUBLISHED:** Regulations implementing the Fisheries Development Law of October 25, 1955, to govern fishing in the waters of San Salvador for commercial, sport, and domestic consumption, and the issuance of licenses were promulgated by Executive Decree No. 77 issued by the San Salvador Ministries of Economy, Agriculture, Finance, and Defense on September 10, 1956. (United States Embassy dispatch dated October 3, 1956.)





### French Cameroons

**CANNED SARDINE MARKET:** With a population one-third less, sardine consumption in the Cameroons is twice that of French Equatorial Africa. It is probable that 75 percent of the total consumption in the Cameroons is by Africans.

Item	Unit	France	French Morocco	West Germany	Belgium	Denmark	Spanish Guinea	Portugal	Other	Total
Quantity	Metric Tons	8.8	1,012.8	8.7	11.9	40.7	262.4	418.3	2.9	1,766.5
Value:	Million C. F. A. Francs	2.1	109.5	1.1	1.0	3.3	19.5	38.0	0.4	174.9
	US\$1,000	11.7	625.6	6.1	5.5	18.6	111.6	217.4	2.6	999.1

Note: Values converted to US\$ equivalent at rate of 175 C.F.A. francs equal US\$1.

Imports of canned sardines totaled 1,766.5 metric tons (valued at US\$999,100) in 1955, with the bulk of the imports supplied by French Morocco.



### French Equatorial Africa

**CANNED SARDINE MARKET:** Imports, the only source of canned sardines in French Equatorial Africa, amounted to 734.0 metric tons (valued at US\$406,118) in 1955 as compared with 872.1 tons (valued at US\$451,336) in 1954.

Country of Origin	1955			1954		
	Quantity Metric Tons	Value		Quantity Metric Tons	Value	
		Million C. F. A. Francs	US\$ 1,000		Million C. F. A. Francs	US\$ 1,000
France . . . . .	33.3	4.2	23.8	29.7	4.1	23.5
Cameroons . . . . .	-	-	-	8.7	1.0	5.5
French Morocco . . . . .	220.0	22.6	128.9	666.7	56.9	325.0
Great Britain . . . . .	-	-	-	1.0	0.1	0.7
Portugal . . . . .	444.4	40.5	231.3	146.9	15.1	86.2
Belgium . . . . .	-	-	-	1.2	0.1	0.5
Norway . . . . .	11.8	1.1	6.2	12.6	1.0	5.6
West Germany . . . . .	21.1	2.4	13.5	7.5	0.6	3.7
Other . . . . .	3.4	0.3	2.4	0.8	0.1	0.6
Total . . . . .	734.0	71.1	406.1	875.1	79.0	451.3

Note: Values converted to US\$ equivalent at rate of 175 C.F.A. francs = US\$1.

Consumption of Portuguese sardines increased in 1955 at the expense of French Moroccan sardines. The most popular sizes of canned sardines are the 3¼- to 5-oz. flat cans. Sixty percent of the consumers prefer sardines packed in olive oil; and 40 percent, vegetable oil.

In 1955 Europeans in French Equatorial Africa accounted for 60 percent of the sardine consumption. Of European consumption, 40 percent was French sardines, 50 percent Portuguese sardines, and 10 percent French Moroccan sardines. Consumption of sardines by Africans fell in 1955 to about 40 percent of the total consumption. About 75 percent of the sardines bought by Africans came from French Morocco and 25 percent from Portugal.

The retail prices of the 3¼- to 5-oz. cans of sardines packed in olive oil range from 26-40 U. S. cents; and in vegetable oil, 11-14 U. S. cents a can.

Imports of any articles from the United States, except urgently needed industrial goods for which there is no French equivalent, are curtailed by stringent exchange controls. This would appear to be true in the case of sardines, in which a foodstuff partially supplied by France is concerned, states a September 5 dispatch from the United States Consulate General at Leopoldville.



### French West Africa

**TUNA CATCH QUOTA FOR SECOND SEASON:** The Tuna Committee which met recently (World Fishing, October 1956) to make a catch quota for the recently developed (started December 1955) tuna fishery off the coast of French West Africa ran into difficulties.

Because of the limited freezing and processing equipment in the French African possessions, the catch was to be fixed at 5,000 metric tons, but it was announced that two freezing ships were coming into operation and that their catch was sold in advance. It was therefore decided to increase the catch in African waters from 5,000 to 6,000 tons. It was also decided that the catch of the St. Jean de Luz fleet should remain at 3,000 tons, that of the Breton fleet should be increased from 2,000 to 3,000 tons, and that local committees should decide how this figure should be divided between landing ports. Prices were fixed at about 13.0 U. S. cents a pound for whole fish, about 14.9 U. S. cents for drawn and bled fish, and about 16.3 U. S. cents when dressed. The Breton fleet's catch is to be delivered to Dakar at these prices.

Note: See Commercial Fisheries Review, February 1956, p. 44.



### Iceland

**ICED-FISH TRADE DISCOURAGED IN FAVOR OF DELIVERIES TO FREEZING PLANTS:** One significant recent trend in Iceland's official fisheries policy is lack of interest on the part of the Government in resuming the iced-fresh fish trade with Western Europe. Both the Government and the freezing plants feel that resumption of this fresh fish trade will disrupt commitments for large quantities of frozen fillets and other fishery products for the Soviet Bloc. The trawler owners' association on the other hand claims that the pending settlement of the United Kingdom ban on direct landings of fresh fish will be to their advantage pricewise.

The difference of opinion between the trawlermen and the Government was settled by an agreement which raised the ex-vessel price of cod from lkr. 0.85 to lkr. 1.00 a kilo (from 2.4 to 2.8 U. S. cents a pound), ocean perch from lkr. 0.75 to 0.90 a kilo (from 2.1 to 2.5 U. S. cents a pound), and the prices for other varieties were increased correspondingly. There also was to be a corresponding increase in the price of salt fish. This agreement was subject to the stipulation that Icelandic trawlers would land at least two-thirds of their catches for domestic processing. The Union of Icelandic Steam Trawler Owners agreed to this condition.

**NEW TRAWLERS MAY BE FINANCED BY FOREIGN LOANS:** A bill has been submitted to the Government (Althing) calling for the construction of 15 new trawlers and 6 smaller vessels financed by foreign loans. The bill calls for US\$9,225,000 for construction of the trawlers and US\$922,500 for the smaller vessels. Loans would be made to the builders of the trawlers for 85-90 percent of the cost and up to 80 percent on the cost of the smaller boats. The Government has ordered that the new

vessels if and when built be distributed with a view to achieving a greater balance of the population throughout the country.



### Japan

**FISHERY RESEARCH SHIP DEPARTS FOR BRAZIL:** The fishery research ship Toko Maru (1,100 tons) left Japan for Brazilian coastal waters on October 20 to assist the Brazilian Government in the development of its marine resources.

The expedition will be led by five Japanese fisheries experts headed by Dr. Koji Nakamura, head of the Fisheries Agency's South Seas Marine Institute. A staff of scientists includes faculty members of Mie and Kochi Universities. They will employ a great deal of new equipment for fishing and processing, and the collecting of oceanographic and biological data.

This is the latest in the series of cooperative endeavors undertaken between the two countries in varied fields such as culture, commerce, emigration, and fishing.

While Food and Agriculture Organization statistics show that Brazil's catch is the largest in Latin America, experts feel that favorable natural conditions make much larger catches possible. They point out that the coastal waters include the mouth of the Amazon where the intermingling of fresh and salt water provides rich nutritive compounds; the Brazilian warm current which abounds in migrating schools of fish; and the extensive South Brazilian sea shelf where the Brazilian warm current and the Falkland cold current meet.

Scientific development of these fishing grounds can bring the people of Brazil a larger supply of protein and contribute greatly to the Brazilian economy.

The charting and collection of scientific data in the area will run from mid-December 1956 until late April 1957.

The research will cover classification, species composition, and size range of fish and plankton, and the temperature, color, transparency, salinity, and chemical components of the waters.

\* \* \* \* \*

**NORTH PACIFIC FACTORYSHIP KING CRAB MEAT PACK THROUGH AUGUST 1956:** The pack of king crab meat by the Japanese factoryships operating in the Sea of Okhotsk and the Bering Sea during August totaled 108,000 cases (48  $\frac{1}{2}$ -lb. cans) to bring the total for the season to 377,000 cases. By the end of August the factoryship operating in the eastern area of the Bering Sea and two of the four fleets fishing in the Sea of Okhotsk had finished for the season.

The pack by area through August 31 was as follows: Eastern area of the Bering Sea, 57,000 cases; western area of Bering Sea, 40,000 cases; Okhotsk Sea, 280,000 cases. The total pack by three factoryship fleets in 1955 was 208,850 cases (Monthly Statistics of Japanese Fisheries, September 1956).

\* \* \* \* \*

**RESEARCH SHIP TO SURVEY WESTERN ATLANTIC FISHERIES:** The Kana-gawa Prefecture's high-seas fisheries guidance ship Sagami Maru (770 tons) left

Yokohama on September 12, 1956, to survey the fishing grounds in the Western Atlantic and in other areas.

Because of the fact that at present one-half of the price of Indian Ocean tuna represents transportation costs, these new fishing ground surveys will be paralleled by market surveys in various parts of western Europe, looking to direct export from the fishing ground to consuming markets as the most advantageous method of operation.

The vessel will sail through the Indian Ocean, the Red Sea, and the Mediterranean, thence to the Atlantic off Cuba and Brazil in South America. Tuna fishing will be done in all of these areas, fish will be landed at various places on the coasts, and the market situation will be studied. The vessel will return by the same route.

The cruise is expected to take 358 days, and the catch goal is 1,280 tons of yellowfin, big-eyed, and albacore tuna (Nippon Suisan Shimbun, September 10, 1956, a Japanese trade publication). This survey is a part of a planned program to alleviate the pressure on Japanese coastal fisheries and to improve the economic position of Japanese fisheries.

\*\*\*\*\*

**RESEARCH SHIP PARTICIPATES IN TUNA-TAGGING PROGRAM:** The Mie Prefecture fisheries guidance ship Jini Maru (196 tons) tagged 270 albacore tuna during two cruises in June 1956 to the albacore grounds about 200 miles off Cape Nojima in Chiba Prefecture. The cruises were made as part of a joint Japanese-United States tagging experiment to study the migrations and growth of albacore tuna. Data on which to base future efforts for this type of study were also acquired (Nippon Suisan Shimbun, September 7, 1956).

\*\*\*\*\*

**TUNA VESSEL TO FISH IN ATLANTIC OCEAN:** The Japanese fishing vessel Koun Maru (479 tons) sailed on September 10, 1956, from Misaki, Japan, with a crew of 33 to fish for tuna in the Atlantic Ocean. The vessel will make Genoa, Italy, its port of landing.

This venture has attracted considerable interest in Japanese fishing industry circles.

The reasons behind the plan for this ship to go to the Atlantic are: (1) most of the operations of tuna fishing boats at present are planned to catch fish for the United States market, but because the fishing grounds of the Indian Ocean and the South Pacific require long voyages averaging about 3 months, the fish are brought back in poor condition and prices are low, and (2) as much as 6 months to a year passes from the time the fish is caught until it is exported.

Under the Koun Maru's operating plan, with a base at Genoa, Italy, the time from capture of the tuna to its landing will average about one month. The ship will fish in the Indian Ocean en route and the plan is to deliver about 300 tons of tuna at Genoa and then fish in the Atlantic. Around mid-May 1957, the vessel will return to Japan with a cargo of Italian rice representing the value of the tuna landed in Italy.



## Mexico

WEST COAST SHRIMP FISHERY FOR 1955/56 PROFITABLE: The shrimp season on the west coast of Mexico, which began on September 1, 1955, and terminated on August 31, 1956, is reported to have been the best that the industry has experienced for a great many years. Exports were high and the boats fishing in coastal waters averaged approximately 50 tons each. Bay production was also very high. At the request of the industry itself the Mexican Government changed the closed season from the summer months to a 60-day period from March 15 to May 15. This conservation measure proved successful, and production in the months following was very good in both quantity and quality.

The market for Mexican west coast shrimp in the United States was excellent all season, due in part to lighter catches by United States vessels operating in the Gulf of Mexico, points out an October 5, 1956, report from the United States Consul in Nogales.

As a result of the excellent season, shrimp-boat and plant owners were able to liquidate financial obligations that had accumulated during the past bad seasons. Plans for expanding and modernizing both plants and fleets are now under way. The shipyards at Mazatlan and Guaymas have under construction or under contract to construct some 40 additional vessels, which will bring the entire shrimp fleet up to about 450 vessels. All equipment for the vessels and shore plants are reportedly being made in the United States.

The trend in the shrimp packing plants is to mechanize the processing of shrimp, partly to solve the problem of labor shortage during peak production and also to improve the packing and packaging of their products to meet consumer demands in the United States.

The policy of the Mexican Government towards the shrimp industry during the past season has been, in general, liberal and cooperative. In August there was an increase in the rate of the export duty amounting to about 40 pesos (US\$3.20) a ton. The increase was expected, but it turned out to be much smaller than anticipated.

\* \* \* \* \*

SHRIMP FISHERY TRENDS, OCTOBER 1956: The October 1956 catch of shrimp on the west coast of Mexico was reported to be off from the high level of 1955. The catches were good, but below those of October 1955 when an unusually good run of brown shrimp appeared. The brown shrimp have not shown up in the catches to date, states a November 6 dispatch from the United States Embassy in Mexico City.

The shrimp catch on the east coast of Mexico this October was reported to be about the same as for October 1955 due to the increased number of shrimp vessels operating, but the catch per boat was down.

The Mexican shrimp fleet is increasing and it is estimated that 50 vessels are now under construction. The shrimp market remained firm and higher prices prevailed this October than in the same month of 1955.

\* \* \* \* \*

MERIDA SHRIMP FISHERY TRENDS, JULY-SEPTEMBER 1956: Exports of shrimp from the Mexican province of Merida during the third quarter of 1956 totaled close to 4.7 million pounds, all shipped to the United States.

Average wholesale prices at Brownsville for the Merida 15-20 count headless brown shrimp were reported as 85 cents in July, 80 cents in August, and 75 cents



in September. The decline in prices was seasonal and market conditions were considered to be good, both for the present and the future.

The buying on credit of boats and gear continues in the Merida shrimp industry. With prospects of increased export taxes and assessments for civic improvements, a serious decline in the market for shrimp could be harmful to the industry, points out an October 19, 1956, dispatch from the United States consul in Merida.

\*\*\*\*\*

SOME FISHERY PRODUCTS ADDED TO IMPORT DUTY LIST: Various preserved fishery products were added to the list of items subject to import duty in the Mexican free zone of Baja California and the partial free zone of the State of Sonora, effective September 8, 1956 (see table).

Table 1 - Preserved Fishery Products Subject to Import Duty in the Mexican Free Zone of Baja California and the Partial Free Zone of the State of Sonora

Product	Mexican Tariff Classification	Duty	
		Specific	+ Ad Valorem
		Pesos Per Kilo	Percent
Tuna, preserved . . . . .	043.00.02	2	50
Mackerel, preserved . . . . .	043.00.06	2	50
Sardines, preserved, weighing with immediate container up to 5 kilos (about 11 lbs.), providing container is labeled to indicate contents. . .	043.00.09	2	50
Crustaceans and molluscs, preserved, not specified . . . . .	043.00.98	2	45

Note: 2 Mexican pesos equivalent to about US\$0.16.

\*\*\*\*\*

TUNA CANNING PLANT AT CAPE SAN LUCAS HAS GOOD SEASON: The tuna canning plant located near the southern tip of Baja California at Cape San Lucas completed a successful season in August 1956. The plant reportedly paid out about US\$400,000 to fishermen and laborers during the packing season. Most of the fish purchased by the cannery was caught by United States fishing vessels operating in the Cape San Lucas area.

The management of the tuna canning plant plans on enlarging the capacity of the plant to handle 25 tons of tuna daily. The expanded packing facilities will provide employment for about 300 local workers, states an October 1 dispatch from the United States Consulate in Tijuana.



## Norway

FACTORYSHIP FISHES FOR SAND LAUNCE: The Norwegian factory trawler Havkvern had excellent luck in fishing for sand eels or launce (*Ammodytes*) which it found in tremendous quantities in the Silver Pit southwest of Dogger Bank in the North Sea, according to reports in Fiskaren (October 3 & 10, 1956), a Norwegian fisheries periodical. Although the Danes have taken sand eels in this area in volume for some years, the Havkvern's trips to the area represent the first Norwegian participation in the fishery. The ship is equipped with a reduction plant and normally fishes for herring.



European Sand Launce (Storsil in Norway)  
(*Ammodytes tobianus*)

(6-12 inches) long. Sand eels are used only for the production of fish meal and oil.

The sand eel season runs from April through July. During this period the Havkvern caught 1,860 metric tons. The sand eels were taken in 10 to 20 fathoms of water and were present in such quantities that trawlers of medium size had average catches of 23-28 tons daily. The usual herring trawls are excellent gear for taking the fish which are from 15 to 30 centimeters

\*\*\*\*\*

CANNED BRISLING PACK MUCH LOWER FOR 1956: Norway's 1956 pack of brisling sardines was reported by the Norwegian Information Service in its October 25 News of Norway to be only 160,000 cases valued at about US\$2.8 million. The pack in a normal year is close to 500,000 cases, worth about US\$8.4 million. The pack as of July 1956 was only 103,000 cases.

\*\*\*\*\*

TERRAMYCIN TESTED ON WHALE MEAT: Two Norwegian whaling companies, in cooperation with a New York Pharmaceutical firm, have for some time been testing the effectiveness of terramycin in slowing the decay of whale meat. According to the Norwegian Journal of Commerce and Shipping, the initial experiments seem promising. Whale meat treated with the antibiotic drug has shown no sign of decay as late as 48 hours after the whale was caught in the Norwegian Sea and brought to the shore station in Norway.

The usual test procedure is to use drug-injecting harpoons. Loading the harpoon tip with terramycin is intended to facilitate the distribution of the bacteria-killing drug throughout the tissues. However, extensive testing will be required to determine just how long this method will delay intestinal decay, which otherwise sets in immediately. Further experiments will therefore be made in the Antarctic (News of Norway, October 25, 1956).



## Panama

NEW VESSELS BEING BUILT: Two small live-bait boats are being built by the largest fisheries cooperative in Panama for use in fishing for corvina (*Cynoscion stlomanni*) and red snapper (3 species--*Lutjanus guttatus*, *L. cynopterus*, and *Hoplopagrus guntheri*), according to a letter received from the President of the Cooperative. These same boats will experiment with commercial trap fishing for spiny lobsters which are reported abundant off both coasts of Panama.

FILLET EXPORTS: The Cooperative has been exporting to the United States frozen skinless fillets packed in one-pound packages. Corvina fillets are being exported at the rate of 8,000 pounds a month; flounder fillets at the rate of 6,000 pounds a month. Also, some exports of catfish fillets have been made

\*\*\*\*\*

**SHRIMP COOPERATIVE BUILDS STEEL TRAWLER:** The first steel shrimp trawler (a 45-ton boat built by a foundry in Colon) to be built in Panama was launched on August 23, 1956. The large Panama shrimp cooperative plans to replace all its wooden vessels with steel craft eventually, due to the high maintenance costs on wooden boats. All the new fishing vessels must be constructed in Panama in order to engage in the shrimp fishery in Panamanian waters, states a September 28 dispatch from the United States Embassy in Panama.



### Republic of the Philippines

**CANNED HERRING AND MACKEREL REMOVED FROM IMPORT CONTROL:** The Monetary Board of the Philippines announced on November 13 that both canned herring and mackerel were removed from the list of products subject to import controls (United States Embassy dispatch, dated November 15, 1956). Under control, imports of canned mackerel and herring were limited by the Philippine Government.



### Portugal

**CANNED FISH EXPORTS, JANUARY-JULY 1956:** Exports of canned fish by Portuguese canners continued to show a substantial decline for the period January-July 1956, as compared with the similar period in 1955. The drop in exports of canned fish thus far in 1956 reflects the poor catch of sardines, states a September 6 dispatch from the United States Embassy in Lisbon.

Portuguese canned fish exports in July 1956 totaled 2,332 tons (122,700 cases), valued at US\$1.4 million, as compared with 4,852 tons, valued at US\$2.4 million, for the same month in 1955.

For the first seven months of 1956, canned fish exports amounted to 20,367 tons (1,071,900), valued at US\$11.6 million, as compared with 32,118 tons, valued at US\$16.4 million, for the same period in 1955.

Portuguese Canned Fish Exports, January-July 1956		
Species	January-July 1956	
	Metric Tons	1,000 US\$
Sardines in olive oil . . . . .	15,522	8,176
Sardinelike fish in olive oil . . .	2,357	2,054
Sardines & sardinelike fish in brine. . . . .	566	109
Tuna & tunalike in olive oil . . .	671	551
Tuna & tunalike in brine. . . . .	169	96
Mackerel in olive oil . . . . .	821	512
Other fish . . . . .	261	135
Total . . . . .	20,367	11,633

For January-July 1956, the leading canned fish buyer was Germany with 3,518 tons (valued at US\$1.9 million), followed by the United Kingdom with 2,416 tons (valued at US\$1.3 million), the United States with 2,310 tons (valued at US\$1.8 million), and Italy with 2,182 tons (value US\$1.3). Exports to the United States consisted of 996 tons of sardines, 1,090 tons of anchovies, and 12 tons of tuna, the September 1956 Conservas de Peixe reports.

\*\*\*\*\*

Portuguese Canned Fish Pack, Jan.-May 1956		
Product	Net Weight	Canner's Value
	Metric Tons	1,000 US\$
<u>In Olive Oil:</u>		
Sardines .....	625	401
Sardinelike fish .....	1,302	1,267
Tuna .....	290	247
Other species (incl. shellfish) ..	45	31
<u>In Brine:</u>		
Sardinelike fish .....	660	201
Other species .....	37	8
Total .....	2,999	2,155

**CANNED FISH PACK, JANUARY-MAY 1956:** The Portuguese canned fish pack of 1,257 tons in May 1956 improved over the very light pack (311 tons) of the previous month. The pack during May was about 65 percent sardinelike fish.

The canned fish pack for January-May 1956 amounted to 2,999 tons (157,800 cases), the September 1956 Conservas de Peixe points out.

The total pack of canned fish for January-May 1955 amounted to 6,567 tons, with sardines in oil accounting for 60-percent of the pack as compared with 22 percent in January-May 1956.

\* \* \* \* \*

**FISHERIES TRENDS, JULY 1956:** Sardine Fishing: The Portuguese sardine catch during July 1956 increased to 5,651 metric tons (ex-vessel value US\$906,000), higher by 4,129 tons than the 1,522 tons reported for June 1956. The July sardine catch was fair but still well below the 9,811 tons reported for July 1955.

Sardines purchased by the packing centers during the month amounted to 2,857 tons (valued at US\$597,000), or about 51 percent of the catch. During July 1955 the canners purchased 5,377 tons (valued at US\$772,000), about 55 percent of the catch. Ex-vessel prices were higher in July 1956, about US\$160 a ton as compared with about US\$130 a ton in July 1955. The balance of the sardine catch was utilized primarily for immediate consumption on the fresh fish market.

The principal port of landing for sardines in July was Matosinhos with 33 percent of the catch, followed by Portimao (2 percent), and Lisbon with about 15 percent.

Other Fishing: In July 1956, landings of fish other than sardines totaled 5,865 metric tons (valued at US\$604,000 ex-vessel) and consisted of anchovy (966 tons) and chinchard (4,869 tons).

\* \* \* \* \*

**LANDINGS OF FISHERY PRODUCTS IN PORTUGAL, MADEIRA, AND AZORES, 1955:** The catch of fish and shellfish by the Portuguese fishing fleets operating out of Portugal, Madeira, and the Azores totaled 481.4 million pounds (218,433 metric tons) in 1955. A substantial catch of cod from the Western Atlantic and the catch of the shore-based whaling fleet are not included. The catch of mainland Portugal was dominated by sardines (47.1 percent) and chinchards (17.8 percent). The catch for the Madeira Islands consisted of 55 percent tuna and related species and 29.6 percent scabbardfish; that for the Azores was 41.3 percent tuna and tunalike species and 37.6 chinchards.

The catch of shellfish in Madeira and the Azores was negligible, but the mainland Portuguese catch of shellfish included 1,491 metric tons of cuttlefish, 914 tons of octopus (pulpo), and 2,026 tons of crustaceans, which included some spiny lobsters, some of which are exported to the United States.

Table 1 - Landings of Fishery Products, <sup>1/</sup> Portugal, Madeira, Azores, 1955

Species	Portugal		Madeira		Azores		Total	
	Metric Tons	US\$ 1,000	Metric Tons	US\$ 1,000	Metric Tons	US\$ 1,000	Metric Tons	US\$ 1,000
Tuna and tunalike . . . . .	1,977	524.0	3,098	400.6	3,027	228.2	8,102	1,152.8
Anchovy and sprat . . . . .	4,873	798.8	-	-	-	-	4,873	798.8
Spanish and common mackerel	4,484	563.9	247	22.3	311	24.6	5,042	610.8
Chinchards . . . . .	34,916	2,770.5	306	31.2	2,759	181.8	37,981	2,983.5
Corvina . . . . .	905	213.1	-	-	-	-	905	213.1
Sardines . . . . .	92,330	11,326.0	-	-	91	12.6	92,421	11,338.6
Cachocho and besugo . . . . .	5,176	618.1	-	-	3	0.6	5,179	618.7
Pargo and sea bream . . . . .	9,612	1,697.1	28	5.7	20	2.6	9,660	1,705.4
Scabbard fish . . . . .	2,276	396.3	1,667	150.1	-	-	3,943	546.4
Whiting . . . . .	13,622	3,728.9	-	-	-	-	13,622	3,728.9
Other . . . . .	25,976	4,435.6	295	44.0	1,120	145.0	27,391	4,624.6
Total Salt-Water Fish . . . . .	196,147	27,072.3	5,641	653.9	7,331	595.4	209,119	28,321.6
Crustaceans . . . . .	2,026	420.0	-	-	15	11.4	2,041	431.4
Squid . . . . .	460	111.4	-	-	2/	0.1	460	111.5
Cuttlefish . . . . .	1,491	207.8	-	-	-	-	1,491	207.8
Octopus . . . . .	914	181.7	-	-	4	1.1	918	182.8
Mollusks . . . . .	3,772	65.3	6	0.7	-	-	3,778	66.0
Shellfish Total . . . . .	8,663	986.2	6	0.7	19	12.6	8,688	999.5
Total Fresh-Water Fish . . . . .	626	187.2	-	-	-	-	626	187.2
Grand Total . . . . .	205,436	28,245.7	5,647	654.6	7,350	608.0	218,433	29,508.3

<sup>1/</sup>Excludes whale and cod catches.

2/ Less than one ton.

Note: Values converted to US\$ equivalent at rate of 28.75 escudos equal US\$1.

\*\*\*\*\*

**NEW FISH CANNING REGULATIONS:** New fish canning regulations, promulgated in a decree-law 40,787, dated September 27, 1956, were designed to improve distribution of sardine supplies among canners and to assure stable prices for fish sold to canners. The decree provides that sardines will be supplied under regulations to be arrived at through joint agreement between the sardine fishermen's guild and the fish-canning guilds. The measure also seeks to fix annual quotas for canners as well as maximum and minimum prices which canners pay for sardines. Canners in localities where the supply of fish is inadequate would be guaranteed supplies from other canning centers under the new regulations.

Government technical and financial support of sales promotion campaigns also is an objective of the new measure. The Portuguese Canned Fish Institute is required to take "necessary measures to increase productivity in the industry to enable it to compete under more favorable conditions in foreign markets."

The Government under the new decree-law is to proceed immediately with reorganization of the fish-canning industry. Powers are to include determination of the minimum size of canning establishments, study of production costs, supervision of sales prices, adjustment of wages, and relocation of surplus labor.

It is thought that the new measure seeks in part to establish means of mitigating seasonal unemployment. At times, conditions calling for relief in some form have occurred with changes in runs of fish off the Portuguese coast and the size of the catch. There had been reports of distress among cannery workers in southern Portugal early in 1956, states an October 11, 1956, dispatch from the United States Embassy in Lisbon.

Sales promotion plans under the new measure refer to means of expanding canned fish supplies for export, and the proposal is made that sales promotion campaigns should aim at marketing sardine surpluses in new markets, specifically in eastern Europe and in the Near East, as well as in the United States. Reference is



made in the preamble of the measure to the fact that "there are no administrative barriers in American markets."



## Singapore

PORT FACILITIES FOR JAPANESE FISHING VESSELS RESTRICTED: The Singapore Ministry of Commerce and Industry in October 1956 issued the following announcement:

"Japanese fishing vessels wishing to make use of the port facilities of Singapore for bunkering, provisions, or repairs will be permitted to do so provided that if cargoes of fish are carried by such vessels none of the fish is landed locally or transshipped.

"Japanese fishing vessels registered by the Japanese Government as tuna fishing vessels may transship their catches in Singapore for onward carriage to other countries under and in accordance with the conditions of special licenses issued by the Controller and Registrar of Imports and Exports. Permission will not be granted for the disposal locally of the catches brought into Singapore by these vessels, but transshipment facilities only will be permitted.

"All Japanese fishing vessels entering the Port are required to report to the Master Attendant immediately on arrival at the Port and will have to comply with his directions. Port clearances will be issued by him to all such vessels when they have complied with the provisions of the Merchant Shipping Ordinance."

The Chief Fisheries Officer of Singapore revealed that the move was in response to an approach by certain Japanese fishing companies which desired better transshipment facilities for sending tuna on to Japan, Europe, and the United States. These fishing companies send fishing vessels to the Indian Ocean to obtain tuna, but wish to avoid having them return all the way to Japan to deliver their catch to the canneries. With the use of Singapore's facilities, the vessels can discharge tuna there for fast onward shipment to canneries not only in Japan, but to the rest of the world as well. Singapore officials, however, were fearful that unless stringent regulations were laid down governing the activities of the Japanese vessels, "marketable" fish other than tuna would be "dumped" on the Singapore market. The earnings of local fishermen would suffer as a result. There was nothing to fear from tuna, since it would have to be canned in order to satisfy local tastes; furthermore, very few retailers would accept fish weighing as much as tuna.

In addition, Malayan fishermen would find it very difficult to compete with the Japanese here. It is for that reason the Fisheries Officer stated, that protective measures of this sort are necessary. Japanese fishing vessels may still bring "marketable" fish to the local market under any one of three conditions: these are, (1) the vessels are chartered by a Singapore or Malayan firm; (2) the vessels are owned by one of the "joint venture" firms recently established here or in North Borneo; or (3) the Japanese permit the intensive training of local fishermen on board. Regarding the third alternative, at the present time over 40 trainees are serving on such Japanese vessels, states an October 18, 1956, dispatch from the United States Consul in Singapore.



## Spain

**FISHERIES TRENDS, SEPTEMBER 1956:** Fishing: The fish catches landed at Vigo, Spain, during September 1956 and sold on the Vigo fish exchange amounted to about 15.2 million pounds, valued at about US\$994,544. The September 1956 landings increased in volume about 30 percent as compared with August 1956 and an increase of about 5.3 percent over September 1955. First sales of fresh fish in September 1956 were made at an average price of about 6 U. S. cents a pound as compared with 9 cents a pound in August 1956 and 5 cents a pound in September 1955.

The albacore tuna (Germo alalunga) moved toward the north of Spain during the early part of September. Catches of albacore entered through the Vigo fish exchange amounted to 210,000 pounds in September as compared with 1.8 million pounds for the previous month. The albacore season was practically finished by the end of September and prices were as high as 20 U. S. cents a pound. On the whole, the albacore season was a successful one for the Spanish fishermen and definitely better than for 1955.

The needle fish (Ramphistoma belone) catches ran high in September and were purchased by the canneries as a substitute for sardines.

Fish Canning: During September 1956, the fish canneries in the Vigo area purchased 8.2 million pounds of fresh fish, as compared with 3.7 million pounds in August 1956 and 5.2 million pounds in September 1955.

All canneries in the Vigo consular district (there are approximately 100 in the Province of Pontevedra) operated at a fairly high level during September with albacore tuna and needlefish catches. The canning of needlefish stepped up as deliveries of albacore decreased. Some Pontevedra canneries even brought albacore by truck from ports in the north of Spain in order to be able to complete their orders.

The olive oil and tinplate situation are the perennial complaints of the canneries. For the present there is an adequate supply of olive oil. Canneries which were able to estimate their requirements at the beginning of the albacore season purchased stocks of olive oil cheaper than the current price. It is reported that the Bilbao plant is presently unable to supply tinplate to the canneries and that imports from Great Britain during September amounted to 400 short tons.

Foreign Trade: Swiss firms have been the largest foreign buyers of albacore, but it is the general opinion that part of the shipments to Switzerland (usually via Rotterdam) reach other countries in Europe. There appears to be no demand for the Spanish albacore in the United States, due to high prices and need for a different method of packing. There have been a few small shipments of frozen octopus (Octopus vulgaris) to the United States with fair prospects for increasing this trade.

\*\*\*\*\*

**TUNA CATCH GOOD FOR 1956 SEASON:** The coastal fishermen of Spain have had the most successful tuna catch in recent years. The market prices have averaged about 60 percent higher this year over 1955, or from about 19-21 U. S. cents a pound as compared with about 12-13.5 U. S. cents a pound in 1955. The higher prices are believed to be due to the better prices offered by French buyers and this has forced Spanish buyers to offer substantially higher prices in order to obtain supplies for canning. It is estimated that about 50 percent of the catch has been sold to the French.

The tunafish canners have also been plagued by a shortage of cannery help and the payment of higher wages has failed to solve this problem. It has been particularly difficult to attract help at overtime wages when overtime is needed to handle

a heavy volume of fish. Some women workers who formerly worked for about 6-7 cents an hour now receive about twice this sum, states an October 17, 1956, dispatch from the United States Consulate in Bilbao.

Note: Values converted to US\$ equivalent at rate of 1 peseta equals US\$0.033.



### Tunisia

SHRIMP PRODUCTION, 1955: The catch of shrimp in Tunisia is grouped with other shellfish under "crustaceans" (shrimp, prawn, and lobsters). The catch in 1955 for this category of landings was only 176,300 pounds. Exports amounted to about 94,100 pounds, all of which went to France, except for 372 pounds to Algeria (a United States Embassy dispatch dated October 8, 1956).



### Turkey

EXPORTS OF FISHERY PRODUCTS ENCOURAGED: In an effort to encourage exports of fishery products, Turkey will permit 10 percent of the foreign exchange obtained from the f.o.b. value of such exports to be allocated for imports of equipment for fishing, transportation, processing, etc., for the use of fishermen, processors, and exporters. The Meat and Fish Office of Turkey will handle the special account at the Central Bank and allocate the equipment to be imported.

It is reported that during 1955 the Turkish catch amounted to 111,523 metric tons of fresh and salt-water fish, of which 15,050 tons (f.o.b. value US\$3.6 million) were exported (14,000 tons fresh or frozen). Greece, Italy, and Rumania were the principal buyers, reports Canada's Foreign Trade of November 10, 1956.



### Union of South Africa

ANTARCTIC WHALING FLEET MAY BE SOLD TO JAPAN: Subject to confirmation by the shareholders and both the Union of South Africa and Japanese Governments, the Union Whaling company of Durban will sell its Antarctic whaling fleet to Japanese interests. This company is the only South African company operating an Antarctic whaling fleet, but it plans to continue its shore-based offshore whaling activities in Durban, South Africa, using the nine smaller catchers left in its fleet.

The Antarctic fleet to be sold consists of the factoryship Abraham Larsen (23,000 tons) and eight catcher boats. The selling price is reported to be US\$7,602,000 for the factoryship and US\$156,800 each for the catcher boats. The factoryship price is said to include US\$1,120,000 in return for an agreement on the part of the Union Whaling company to refrain from Antarctic whaling for five years. The plans call for delivery of the whaling fleet at the end of the 1956/57 season, according to United States dispatches from Pretoria dated November 2, 1956, and Durban, dated October 23, 1956.

The sale is being made because of decreasing financial returns due to the reduced number of whales that can be taken in the Antarctic under international agreement and steadily increasing operating costs. The Japanese whaling fleets

are in a relatively favorable profit-making position as they have a ready demand for whale meat in contrast to the Union's dependence on the sale of whale and sperm oil only.



### U. S. S. R.

**NEW DIESEL TRAWLERS TO HAVE CANNING PLANTS:** Canning plants as seen on board the Russian vessel Muksun, which put into Grimsby recently, are to be fitted to the 20 Diesel trawlers being built in England for Russia. Each plant costs £1,100 (US\$3,080) and is essentially an innovation for long-distance trawlers.

The first plant was fitted into the trawler Pioneer in January 1956 and consists of a semi-automatic vacuum double-seaming machine, and a horizontal steam sterilizing retort.

The equipment is built entirely to Russian specifications and caters for all the operations involved in filleting, freezing, and canning livers, and handles about 1,500 8-ounce cans a day.

Some 15,000 cans are carried. The cans are fitted in trays in a special stowage rack, which separates the can store from the packing room and insures smooth operations under difficult sea conditions. (The Fishing News, September 7.)

\*\*\*\*\*

**SCIENTISTS USE LIGHT TO CATCH FISH:** Experiments have shown that while fishing on dark nights over 50 different kinds of fish can be attracted and caught more easily with the help of electric light (The Fishing News, September 21, 1956). The fish were not attracted to the electric light during moonlit nights.

This has been proved by a Russian scientist who conducted tests in which a powerful electric lamp was lowered into the water alongside a conical net. The net was hauled in full of fish within 2 or 3 minutes.

One small vessel using this method made a particularly large catch of mackerel, obtaining some 17 tons of fish in one night.

To assist the scientist to study the movements of the fish round the light, underwater television equipment was used, comprising a small waterproof shell containing a highly sensitive transmission tube connected by cable to a television receiver on the ship.

\*\*\*\*\*

**STERN-TRAWLING FACTORYSHIPS AND DIESEL TRAWLERS COMPLETED:** The first of 24 stern-trawling factoryships and the first of 20 Diesel trawlers being built for U. S. S. R. have been completed.

The factoryships are being built in West German shipyards apparently of the same general design as the British factoryship Fairtry. Approximately 245 feet between perpendiculars and 2,555 gross tons, they are designed to freeze whole fish; to process, freeze, and pack fillets; and produce meal and liver oil. They will carry a crew of 100.

The Diesel trawlers are being built at Lowestoft, England. They are approximately 172 feet between perpendiculars and have meal and liver plants. (Fisheries Newsletter, a publication of Australia; Commonwealth Director of Fisheries.



### United Kingdom

**CONTINUES IMPORTS OF JAPANESE CANNED SALMON:** The British Board of Trade has announced that arrangements for further imports of Japanese canned salmon have been made. Imports of canned salmon will be made to a value of US\$4.2 million and import licenses will be valid up to September 30, 1957, states a September 26 dispatch from the United States Embassy in London.

\* \* \* \* \*

**NEW FROZEN FISH PROCESSING PLANT FOR HULL:** A new fish and other foods processing plant, estimated to cost over US\$280,000, is nearing completion at Hull, England. The new plant, which is situated close to the Hull fish piers, will have a frontage of about 240 feet, states The Fishing News (September 14, 1956), a British fisheries periodical.

The new Hull plant, which will be one of the finest of its kind in Europe, will replace a smaller one. Present employment of between 50-60 employees will be doubled as developments warrant it.

The ever-increasing popularity of frozen products in their attractive wrappings has encouraged the present ambitious venture, which among other things should be a dollar earner.

The production of a wide range of frozen foodstuffs, mostly fish, is contemplated. Among the line which will be prepared there are fish sticks, frozen cod, and plaice.

A spacious unloading platform for the receipt of fish has been built at the entrance to the new factory. Much of the ground floor space is taken up by a tiled filleting room with two processing lines and other equipment, which includes a conveyor-belt system. Three freezing units, each of which is capable of dealing with a ton of fish in 2 hours, are being installed. There is also cold-storage space for about 300 metric tons.

\* \* \* \* \*

**NINTH TRAWLER FOR RUSSIA LAUNCHED:** The ninth vessel of the 20 Diesel trawlers ordered by Russia from a British shipyard was completed and launched on October 9, 1956, states the October 12 issue of The Fishing News, a British trade periodical.

These vessels, almost 190 feet in over-all length with a loaded displacement of approximately 1,300 tons, are especially constructed to meet Arctic conditions. Exceptional consideration has been given to their stability in ice conditions and general seaworthiness.

They have an exceptionally high standard of equipment and finish. The fifth Russian trawler Ogonj (Flame) is rapidly completing her fitting out and will shortly undergo sea trials.







# FEDERAL ACTIONS

## Federal Trade Commission

### SALMON PRICE FIXING IN PUGET SOUND AREA ORDERED STOPPED:

The Federal Trade Commission on October 22, 1956, ordered (Order and Docket No. 6376, Salmon) that fixing of salmon prices in the Puget Sound area be stopped. The order is directed to the area fishermen's union and vessel owners' association. The October 26 Federal Register published the cease and desist order.

The Commission, in an order accompanied by an opinion by Commissioner Robert T. Secrest, adopted as its own the initial decision of Hearing Examiner William L. Pack, which prohibits price-restricting agreements between these two groups.

Commissioner Lowell B. Mason dissented to the order "to the extent that it attempts to impose sanctions upon association members and union members who were not parties respondent."

The examiner had found that the two groups have made restrictive agreements which, along with minimum price-fixing contracts negotiated between the union and the area salmon cannery, "substantially" restrain competition in the industry with a tendency to enhance the price of canned salmon.

Thirteen area cannery, who had been named in the Commission's complaint charging the conspiracy, accepted a consent order in March 1956 prohibiting price-fixing activity.

The Puget Sound salmon area extends from the Canadian Border and Cape Flattery 150 miles south to Seattle and Tacoma. Salmon is one of the most important industries in that part of the United States, where in 1954 the wholesale value of the salmon pack was \$12 million. "Purse Seine" vessels, so named because the seines used resemble purses, account for approximately 75 percent of the salmon catch in the area.

The Union had argued that the boat owners actually are agents of the cannery and that, therefore, the fishermen are employees of these cannery. Any agreement between the Union and the cannery, this respondent asserted, is an agreement for wages.

In making this defense, the Union had asked the examiner to require 10 of the cannery to produce certain records, showing the negotiations between the cannery and the boat owners, particularly with respect to post-season bonuses paid to skippers, for a period of six years. The examiner's refusal to do this was appealed to the Commission.

Denying the appeal, Commissioner Secrest stated:

"The record clearly shows that the skippers of Purse Seine Vessels are independent businessmen. . . . The contention that evidence showing a connection between post-season bonuses and the pounds of fish purchased would be of such weight as to prove, in the face of the record, that the fishermen are in fact employees of individual cannery appears to be entirely void of any merit. The regular settlements between skipper and cannery are directly related to the pounds of fish purchased, but this fact has not served to indicate the alleged relationship. Even if the bonuses are likewise related to the pounds of fish purchased, why should the result be any different?"

In addition to the fact that this evidence would have no material bearing on the issues, Commissioner Secrest continued, the request is unreasonable in scope. The only basis for requesting extensive documents, including highly confidential business matters, is "the mere speculation that the records may contain evidence to support its defense."

Elaborating on the relationship of the cannery and boat owners, Commissioner Secrest noted that the skippers of the vessels own their gear, and sometimes, their boats, hire their crews, and assume responsibility for withholding taxes and social security payments. They also fish when and where they want to. In addition, he continued, the fact that a cannery may hold a mortgage on a vessel has no bearing on the question of control. "The relationship involved," he concluded, "is that of sellers and buyers of fish."

The two agreements which the Commission found are illegal are the "Salmon Agreement" between the union and the cannery and the "Working Agreement" between the union and the vessel owners.

The Salmon Agreement, whether executed with the union by one or all of the cannery, has the practical effect of fixing minimum prices paid by only one or all to the vessel owners.

Tied to this agreement is the Working Agreement, providing in part that no boat is allowed to leave for the fishing grounds or be moved from its home port until the price agreements have been signed. "Any vessel violating this section," the Working Agreement provides, "shall be declared unfair."

The order against the union and the vessel owners prohibits the following activities:

1. Entering into "Working Agreements" or "Salmon Agreements" or any others designed to fix the prices of raw or fresh salmon;

2. Interfering with the operation of any fishing vessel with the purpose of maintaining any price-fixing agreement.

The order does not prevent any member of the vessel owners' association "acting individually" from negotiating with canners concerning salmon prices. It also does not prevent: any collective bargaining between the union and employers concerning wages, hours, and working conditions of union members; or any association of fishermen from acting in accordance with the Fisheries Cooperative Marketing Act.

The Commission's complaint was filed on June 28, 1955.



## Department of the Interior

### U.S. FISH AND WILDLIFE SERVICE

#### REORGANIZATION BECOMES EFFECTIVE:

Secretary of the Interior Fred A. Seaton announced November 6, 1956, that reorganization of the Department's Fish and Wildlife Service, as provided by Public Law 1024 enacted in 1956, became effective as of the close of business on November 5, 1956.

In making the announcement, Secretary Seaton said that appointments have not been made to the two new top-level positions created by the reorganization--Assistant Secretary for Fish and Wildlife and Commissioner of Fish and Wildlife. Appointments to both positions are to be made by the President. They are subject to Senate confirmation.

Two separate bureaus are established under the reorganization as components of the new United States Fish and Wildlife Service, the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries. Details with respect to internal organization and functions will be announced shortly.

Secretary Seaton designated John L. Farley as Acting Director, Bureau of Sport Fisheries and Wildlife, and Arnie J. Suomela as Acting Director, Bureau of Commercial Fisheries. Farley has been Director and Suomela has been

Associate Director of the old Fish and Wildlife Service.

The Bureau of Sport Fisheries and Wildlife will be responsible for matters relating primarily to migratory birds, game management, wildlife refuges, sport fisheries, sea mammals (except whales, seals, and sea lions), and related matters. The Bureau of Commercial Fisheries will be responsible for matters relating primarily to commercial fisheries, whales, seals, and sea lions, and related matters.

Until the new Assistant Secretary and Commissioner are appointed, the two Acting Directors will report directly to the Secretary of the Interior. All funds, records, personnel, and other properties, of the Fish and Wildlife Service have been transferred to the new United States Fish and Wildlife Service, and employees and officers were directed to continue to discharge their duties as before the transfer.

The present reorganization is the first major action of this nature to be undertaken since 1940, when the Bureau of Biological Survey and the Bureau of Fisheries were combined to form the Fish and Wildlife Service in the Department of the Interior. A year earlier the two bureaus had been transferred to Interior from the Departments of Agriculture and Commerce, respectively.

The new post of Assistant Secretary for Fish and Wildlife is the first such position to be created since May 24, 1950, when four Assistant Secretaries were authorized by the Congress to direct the Department's functions in Public Land Management, Water and Power Development, Mineral Resources, and Administration.

The old Fish and Wildlife Service has been under the supervision of the Assistant Secretary for Public Land Management.

The reorganization was described by Secretary Seaton as an important assurance to sportsmen that "the Federal Government is increasing its management efforts" to insure adequate fish and

and wildlife resources for recreational purposes. At the same time, he continued, it will help enable the commercial fishing industry attain its proper place in the national economy.

"The greater recognition of fish and wildlife conservation which will

result will benefit the entire Nation," the Secretary concluded.

The notice as it appeared in the November 6, 1956, Federal Register follows:

#### DEPARTMENT OF THE INTERIOR

##### UNITED STATES FISH AND WILDLIFE SERVICE

##### REORGANIZATION OF FISH AND WILDLIFE ACTIVITIES, GENERAL PROCEDURES, AND EFFECTIVE DATE OF ESTABLISHMENT

In accordance with the authority vested in the Secretary of the Interior pursuant to section 3, subsection (f) of the Fish and Wildlife Act of 1956 (70 Stat. 1119), the reorganization prescribed by such Act is hereby declared to be effective as of the close of business November 5, 1956.

The United States Fish and Wildlife Service, as prescribed by such Act, consists of a "Bureau of Commercial Fisheries" and a "Bureau of Sport Fisheries and Wildlife." The United States Fish and Wildlife Service succeeds to and replaces the Fish and Wildlife Service of the Department of the Interior.

The functions of the United States Fish and Wildlife Service will be administered under the supervision of the Commissioner of Fish and Wildlife, who will be subject to the supervision of the Assistant Secretary for Fish and Wildlife.

The Bureau of Commercial Fisheries, under a Director, will be responsible for matters relating primarily to commercial fisheries, whales, seals, and sea-lions, and related matters. The Bureau of Sport Fisheries and Wildlife, under a Director, will be responsible for matters relating primarily to migratory birds, game management, wildlife refuges, sport fisheries, sea mammals (except whales, seals and sea-lions), and related matters. Until the positions of Assistant Secretary for Fish and Wildlife and Commissioner of Fish and Wildlife are filled, the Directors will report directly to the Secretary.

All funds, positions, personnel, records, and other properties of, or assigned to, the Fish and Wildlife Service are transferred to the United States Fish and Wildlife Service, effective as of the time of its establishment, and the positions so transferred shall be positions in the United States Fish and Wildlife Service. Until further notice, each officer or employee is directed to continue to discharge the duties of, and is empowered

to continue to exercise the authority previously vested in, such person or in the transferred position which he may hold.

The authority now vested in the Director, Fish and Wildlife Service, expressly, or as the head of a bureau, is hereby and until further notice delegated severally to the Director, Bureau of Commercial Fisheries and the Director, Bureau of Sport Fisheries and Wildlife to the extent that such authority relates to any matter which is the responsibility of the bureau, including any administrative matter. Such authority may not be redelegated.

Section 3, subsection (e) of the Fish and Wildlife Act of 1956, provides: "Except as changed by the terms of this Act or by subsequent laws or regulations, all laws and regulations now in effect relating to matters heretofore administered by the Department of the Interior through the former Fish and Wildlife Service as heretofore existing, shall remain in effect."

FRED A. BEATON,  
Secretary of the Interior.

NOVEMBER 3, 1956.

\* \* \* \* \*

##### ORGANIZATION DESCRIBED:

Organizational details of the new United States Fish and Wildlife Service, whose establishment under Public Law 1024 became effective on November 6, 1956, were announced on November 9 by the Secretary of the Interior.

As announced earlier, two new top-level positions were created by the reorganization to direct the activities of the new Service. Appointments to these new positions, Assistant Secretary for Fish and Wildlife and Commissioner of Fish and Wildlife, will be made by the President, subject to confirmation by the Senate.

Direct supervision will be exercised by the Commissioner over the operations of the two new bureaus, the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries. Each bureau will have a Director, Associate

Director, and Assistant Director.

The Commissioner will be responsible also for functions of the Divisions of Administration, Information, and River Basins, each of which will perform services in connection with the work of both the bureaus.

Each of the bureaus will have its office of budget and finance, and each will maintain its regional organizations and research activities in their respective fields of responsibility.

With reference to the Bureau of Sport Fisheries and Wildlife, the organizational details approved by the Secretary state the bureau's objectives as follows:

"To insure the conservation of the Nation's wild birds, mammals, and sport fish, both for their recreational and economic values, with a view to preventing

their destruction or depletion and to encourage the maximum present use of the Nation's fish and wildlife resources that is compatible with their perpetuity. This objective is to be achieved by the acquisition and application of fundamental knowledge necessary for intelligent management of fish and wildlife resources so that hunters, anglers, and others may continue to enjoy and use these resources."

Principal components of this bureau are the Division of Sport Fisheries, Division of Technical Services, and Division of Wildlife. Responsibility is vested in this bureau for fish hatcheries, except those operated in connection with the Columbia River fisheries program which are assigned to the Division of River Basins and under the direct supervision of the Commissioner.

The Bureau of Sport Fisheries and Wildlife will be responsible for matters relating primarily to migratory birds, game management, wildlife refuges, sport fisheries, sea mammals (except whales, seals and sea lions), and related matters.

Objectives of the Bureau of Commercial Fisheries are stated as follows:

"To aid in maintaining the welfare of the commercial fisheries of the United States and its Territories by conducting research, investigations, and studies and by providing marketing, informational and other services for the commercial fishing industry and the general public. This objective is to be achieved in consonance with the policy to prevent the destruction and depletion of the Nation's fishery resources and to encourage their maximum utilization for the benefit of the country as a whole."

Principal components of this bureau are the Division of Fisheries Management, Division of Marketing and Technology, and Division of Research. In addition, it has an Office of Loans and Grants to administer the loan program designed to aid the commercial fishing industry.

The Bureau of Commercial Fisheries will be responsible for matters relating primarily to commercial fish-

eries, whales, seals, sea lions, and related matters.

\*\*\*\*\*

#### FISHERIES LOAN REGULATIONS CHANGED:

An amendment to refinancing provisions of the fisheries loan regulations under the Fish and Wildlife Act of 1956 was announced November 19, 1956, by the Secretary of the Interior Fred A. Seaton.

The amendment is designed to permit refinancing in the case of liens and existing preferred mortgages and secured loans in those instances in which "the Secretary deems such refinancing to be desirable" in carrying out the purposes of the Act.

The amendment applies to Section 160.4b (2 and 3) of the regulations carried in the Federal Register October 18, 1956, which set forth the rules concerning the \$10,000,000 revolving fund provided by Congress to bring about a general rehabilitation of fishing vessels and fishing gear, thereby contributing to more efficient and profitable fishing operations.

The initial regulations prohibited the use of loans for paying previously incurred debts. The new regulations provide for marshalling and liquidating of indebtedness of the applicant to existing lien holders at the discretion of the Secretary. They also contain general provisions permitting the use of wider discretion in dealing with refinancing problems.

The amendment as it appeared in the November 17, 1956 Federal Register follows:

#### TITLE 50—WILDLIFE

##### Chapter I—Fish and Wildlife Service, Department of the Interior

##### Subchapter J—Fisheries Loan Fund

##### PART 160—LOAN PROCEDURES

##### QUALIFIED LOAN APPLICANTS

Subparagraphs (2) and (3) of paragraph (b) of §160.4, are amended to read as follows:

(2) Refinancing existing preferred mortgages and secured loans except in those instances where the Secretary



deems such refinancing to be desirable in carrying out the purpose of the act.

(3) Paying creditors for debts previously incurred, except for marshalling and liquidating the indebtedness of the applicant to existing lien holders in those instances where the Secretary deems such action to be desirable in carrying out the purpose of the act.

This amendment shall become effective upon publication in the *FEDERAL REGISTER*.

(Sec. 4, 70 Stat. 1121)

FRED A. SEATON,  
*Secretary of the Interior.*

NOVEMBER 13, 1956.



## Department of the Treasury

### BUREAU OF CUSTOMS

#### COMMENTS REQUESTED ON APPRAISAL OF IMPORTED ARTICLES UNDER CUSTOMS SIMPLIFICATION ACT OF 1956:

The Bureau of Customs, Treasury Department, is now preparing a preliminary list of those imported articles the dutiable value of which would be reduced by 5 percent or more under new appraisal procedures established by the Customs Simplification Act of 1956 (Public Law 927, 84th Congress, 70 Stat. 943). A number of fishery products will probably be involved.

This Act, among other things, provides for a change in the method of determining the value of imported goods which are subject to ad valorem duties. In general, the primary basis for determining their dutiable value is to be the "export value" of the article. With certain exceptions this is to replace the present method which provides for ascertaining the "foreign value" of the product--as well as the "export value" and for the duty to be calculated upon the higher of the two.

The new method of appraisal is not to apply to imports of articles on which the Treasury Department finds that the dutiable value would be reduced

by 5 percent or more of the average or more of the average value at which such articles were actually appraised during fiscal year 1954. Items determined to be reduced will be published in a preliminary list.

The Bureau of Customs announced in the *Federal Register* of November 9, 1956, that consideration will be given to any relevant views of interested parties as to why particular articles should appear on the list or as to why particular articles should not appear on the preliminary list even though closely related articles may properly appear on the list.

Upon the publication of the preliminary list, interested parties will then have 60 days in which to present reasons for belief that any imported articles not specified in such list would have been so appraised. The articles involved will be given consideration and if substantiated by investigation, shall be added to the list which shall be published as a final list. Articles on that list will not be appraised under the new valuation provisions. Any article not specified in the final list shall, 30 days after publication, be appraised in accordance with the new valuation provisions of Section 402a, Tariff Act of 1930, as amended by the Customs Simplification Act.

Under the new Act, the export value of imported merchandise shall be the price at the time of exportation to the United States, at which such or similar merchandise is freely sold or, in the absence of sales, offered for sale in the principal markets of the country of exportation, in the usual wholesale quantities and in the ordinary course of trade, for exportation to the United States, plus, when not included in such price, the cost of all containers and coverings, and all other expenses incidental to placing merchandise in condition packed ready for shipment to the United States.

As presently used, the foreign value is the market value or the price at the time of exportation of such merchandise to the United States at which such or similar merchandise is freely offered for sale for home consumption to all purchasers in the principal markets in the country from which exported.



The value includes the cost of all usual containers and coverings, unless otherwise specifically provided for. In addition, the foreign value includes all other costs, charges, and expenses incidental to placing the merchandise in condition, packed ready for shipment to the United States. Ocean freight, marine insurance, consular fee, and any other non-dutiable charges are not included.

The export value under current usage is the market value or the price, at the time of exportation, at which such or similar merchandise is freely offered for sale to all purchasers in the principal markets of the country of exportation for exportation to the United States, plus the costs incidental to placing the merchandise in condition ready for shipment to the United States. If an export value higher than the foreign market value is established by the Customs, the higher value is then regarded as the value of the imported merchandise.



## White House

### TARIFF COMMISSION'S RECOMMENDATIONS FOR INCREASED DUTIES ON GROUND FISH FILLETS REJECTED:

The President announced that he has decided against a tariff increase as recommended by the United States Tariff Commission in the groundfish fillets "escape clause" case, a December 10, 1956, news release from the White House states.

The President, in identical letters to the Chairmen of the Senate Finance and House Ways and Means Committees, said he "was not persuaded that, on balance, the proposed duty increase would constitute a sound step in resolving" the difficulties confronting the domestic groundfish fishing industry. "Because of that conviction," the President continued, "I have decided in view of all of the factors bearing on this case that I cannot accept the Tariff Commission's recommendations."

The text of the President's letters to the Chairmen of the Senate Finance

and House Ways and Means Committees is as follows:

"Dear Mr. Chairman:

"On October twelfth the United States Tariff Commission, pursuant to Section 7 of the Trade Agreements Extension Act of 1951, as amended, submitted to me a report of its findings and recommendations in the groundfish fillets "escape clause" case. The Commission found, as a result in part of the customs treatment reflecting the trade agreement concession applying to these products, that they are being imported into the United States in such increased quantities as to cause serious injury to the domestic industry. The Commission accordingly recommended that those imports of groundfish fillets presently dutiable at  $1\frac{7}{8}$ ¢ per pound should be dutiable at 2.8125¢ per pound, and that those dutiable at  $2\frac{1}{2}$ ¢ per pound should be dutiable at 3.75¢ per pound.

"It is the Tariff Commission's responsibility in these matters to investigate and report to the President any finding of serious injury or threat of serious injury within the meaning of the law. It is the President's responsibility, on the other hand, to consider not only the question of injury and measures recommended for its relief, but also all other pertinent factors bearing on the security and well-being of the nation.

"As an aspect of national policy dedicated to fostering the security and economic growth of the United States, this nation seeks to encourage in all feasible ways the continued expansion of beneficial trade among the free nations of the world. In view of this policy I am, as I have said before, reluctant to impose a barrier to our trade with friendly nations unless such action is essential and clearly promising of positive, productive results to the benefit of the domestic industry in question. My reluctance to impose such a barrier is heightened in this case because the other nations concerned are not only our close friends, but their economic strength is of strategic importance to us in the continuing struggle against the menace of world communism.

"I have analyzed this case with great care. I am fully aware that the domestic groundfish fishing industry is faced with serious problems, but I am not persuaded that, on balance, the proposed duty increase would constitute a sound step in resolving those difficulties. Because of that conviction, I have decided in view of all of the factors bearing on this case that I cannot accept the Tariff Commission's recommendations. It might well be, in fact, that the proposed duty increase would only further complicate the industry's basic problems.

"Over the years, the consumption of groundfish fillets has shown a persistent upward trend, consumption rising to a record level in 1955. This trend is expected to continue; the United States, by all indications is heading toward a further increased population and a greater expansion of its economy. If, as this growth takes place, there is a proportionate increase in requirements for fish and fish products in the United States, the domestic demand for these products will more than exceed the present combined total of domestically caught fish plus imports. This is an encouraging prospect which the domestic industry should prepare to exploit.

"At the same time, I recognize that beset as it is with problems ranging from the age of its vessels to competition with other food products, the fishing industry of the United States will experience difficulties in the years ahead, despite the bright prospects for increased consumption of fish and fish products, unless bold and vigorous steps are taken now to

provide root solutions for the industry's problems. To this end, the Administration last year proposed and I signed into law several bills designed to assist the industry in improving its competitive position. These laws include provisions for increased funds for research and market development programs, educational grants, and a \$10 million revolving loan fund for vessel and equipment improvement purposes.

"The Administration's examination into the industry's problems has continued beyond the enactment of these laws. These studies, in which we are benefitting from consultations with State and local officials and private groups, look toward the development of additional opportunities for promoting the well-being and sound management of all of our fish and wildlife resources, including our commercial fish-

eries resources. These further efforts should be of assistance to the domestic groundfish fishing industry in its search for solutions to the fundamental problems it faces. They should also help the industry to improve its position without the imposition of further trade restrictions which might actually discourage needed improvements.

"This approach is consistent with our objective of achieving a dynamic, expanding, free enterprise economy and also accords with our national policy of seeking the highest attainable levels of mutually profitable and beneficial trade and investment among the countries of the free world."

/s/ Dwight D. Eisenhower

### CONVALESCING VETERANS HAVE "GET WELL" OPPORTUNITIES THROUGH FISHING

A program called "fishery management assistance to Veterans Administration hospitals" may be just "part of the job" for the biologists of the U. S. Fish and Wildlife Service but it is a light in the dark for many veterans, young and old, who are attempting to recover from the rigors of war.

For "fishery management assistance" made it possible for the Veterans Administration hospital at Downey, Ill., to develop a half-acre pond into a fishing spot which afforded the patients 3,000 fishing visits during a single season. In another case, assistance was rendered when the Temple, Tex., veterans facility was developing a 12-acre lake which will mean fishing recreation to hundreds of veterans who are convalescing. At the Northampton, Mass., veterans installation, it means a chance for patients to take catchable-size trout which the Fish and Wildlife Service plants there annually.

Hospital officials have repeatedly declared that they regard fishing as "extremely beneficial to patients" and in many instances Veterans Administration officials have asked for technical help in stream and pond development. In the period 1951-1955, the Fish and Wildlife Service responded to requests for help at 45 of these installations. In most instances, some improvement of opportunities for recreational fishing was possible.

The amount and kind of technical aid given depends upon conditions. The Fish and Wildlife Service supplies no funds for necessary development. Financing and getting the work done is the responsibility of the Veterans facility and is often accomplished with the help of interested local groups. But the Service does provide, in addition to technical guidance for fishery development, such hatchery fish as may be required for the management programs.

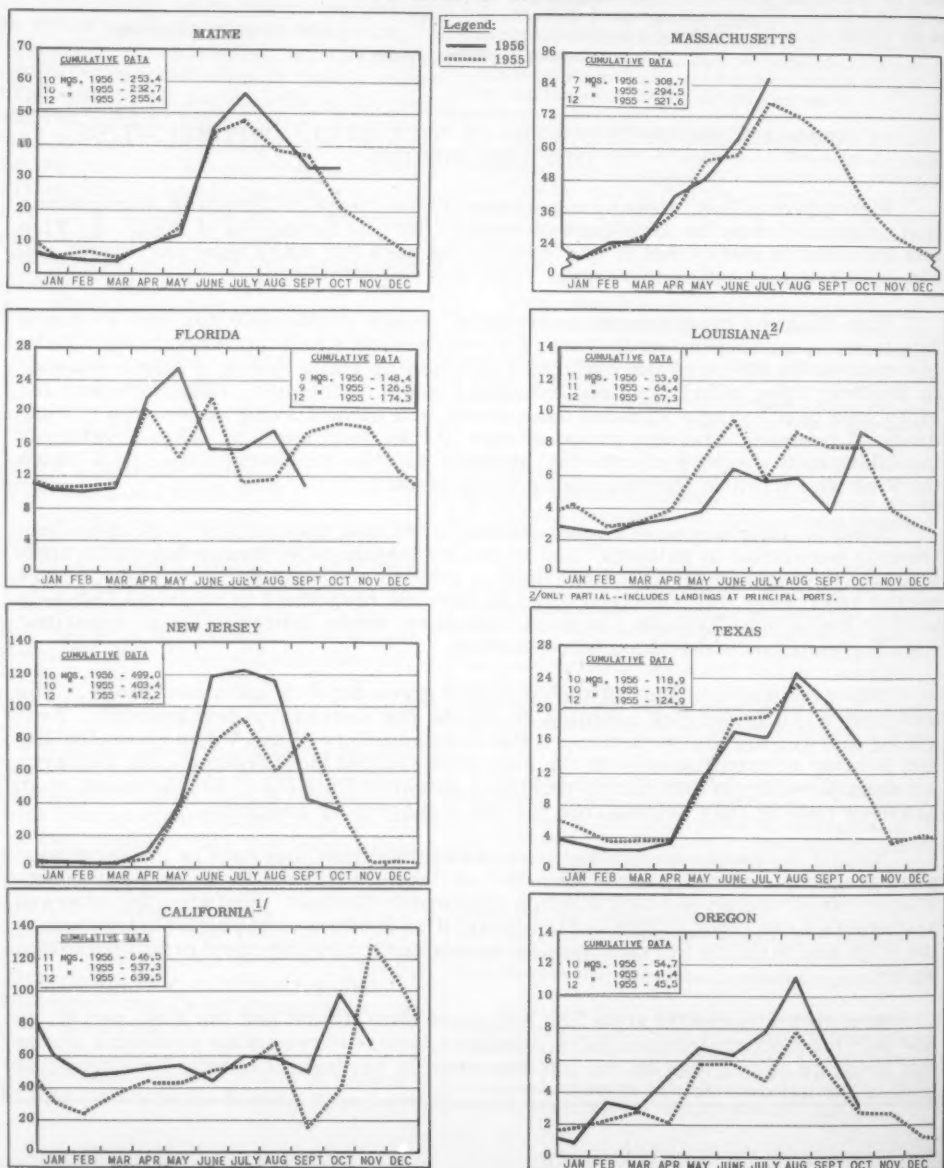
Not all the assistance to Veterans Administration hospitals is given on hospital property, for many times there are no fishing waters on the hospital grounds. When suitable water is found within a reasonable distance -- and when the veterans are assured the right to fish and transportation facilities are available for them -- the Fish and Wildlife Service applies the necessary management practices to that water.

In many instances the state fish and game department and the Fish and Wildlife Service cooperate on projects; in others, where survey of the problems shows that the state agency can do the job more easily because of nearby facilities, the task is turned over to the state.

# FISHERY INDICATORS

## CHART 1 - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds

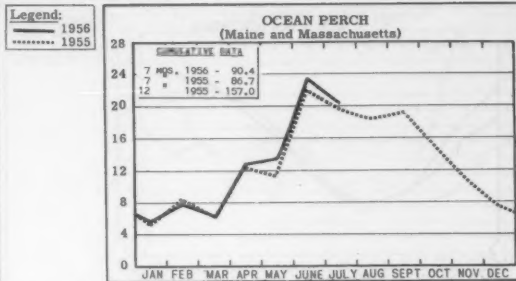
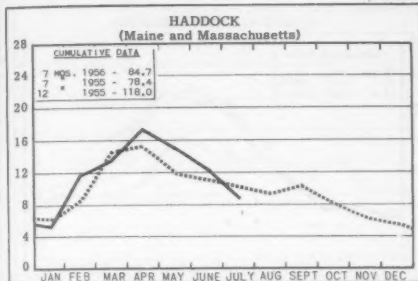


<sup>1/</sup>ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

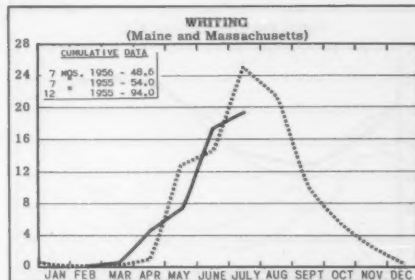
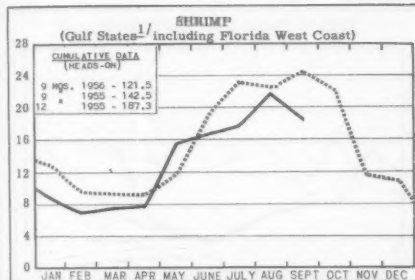
<sup>2/</sup>ONLY PARTIAL--INCLUDES LANDINGS AT PRINCIPAL PORTS.

## CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

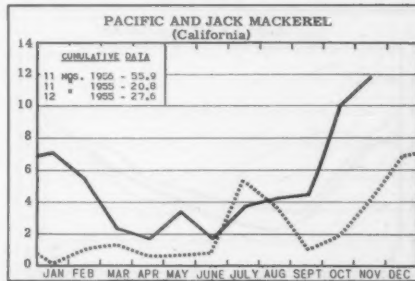
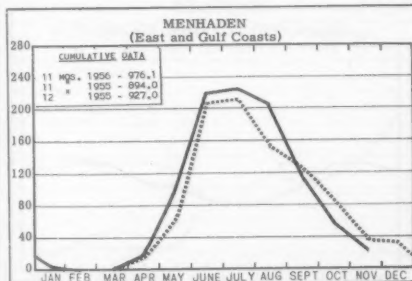


In Millions of Pounds

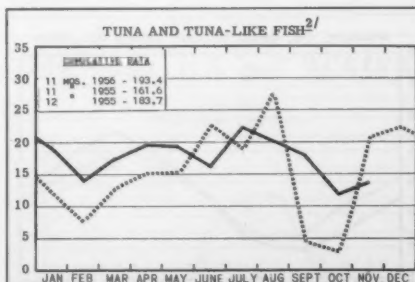
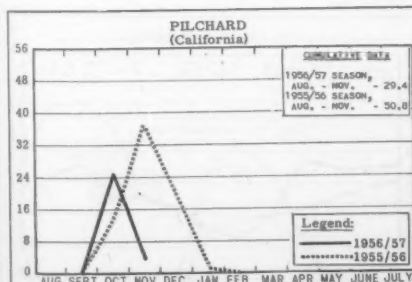


<sup>1/</sup>LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



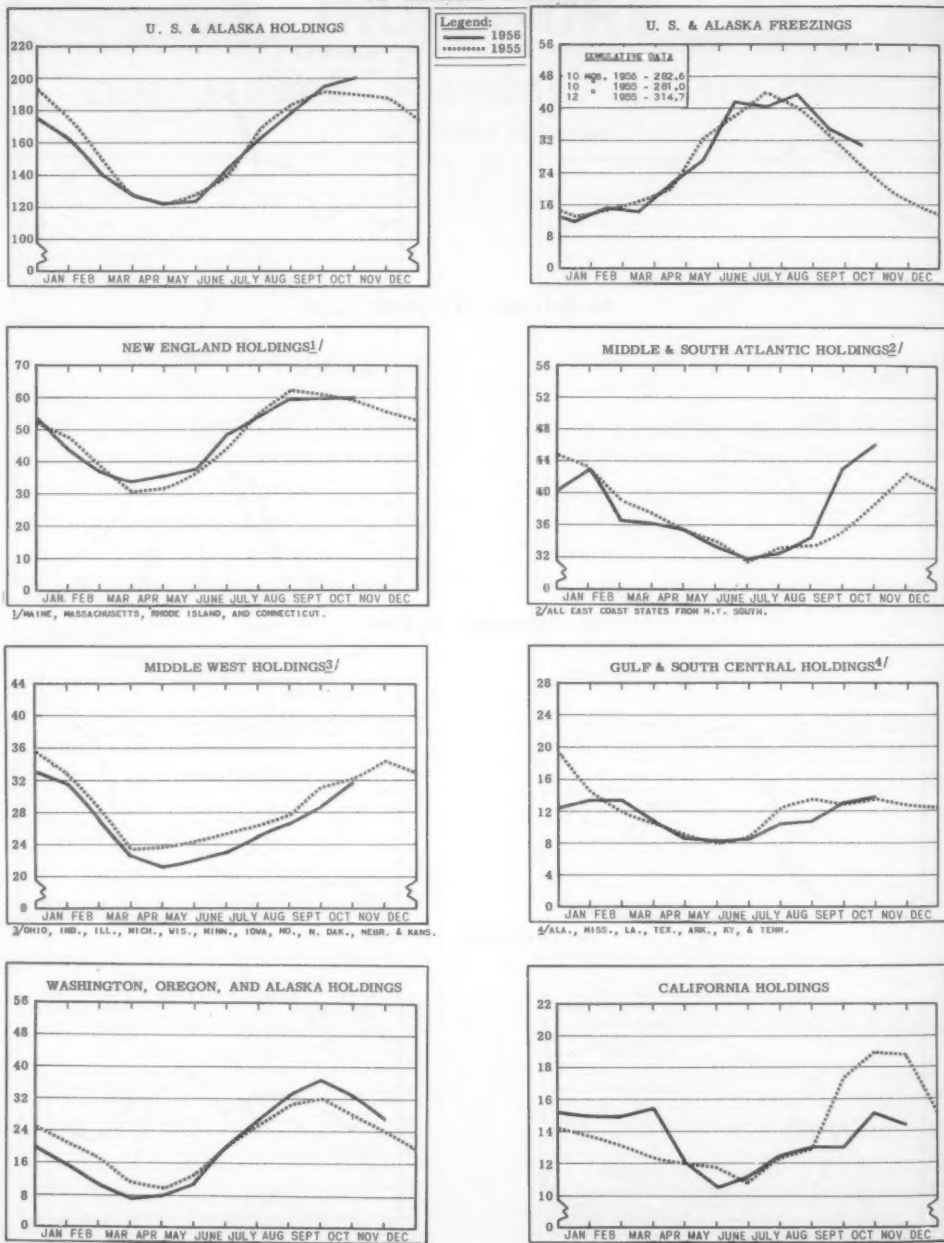
In Thousands of Tons



<sup>2/</sup>RECEIPTS BY CALIFORNIA CANNERIES, INCLUDING IMPORTS.

# CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS \*

In Millions of Pounds

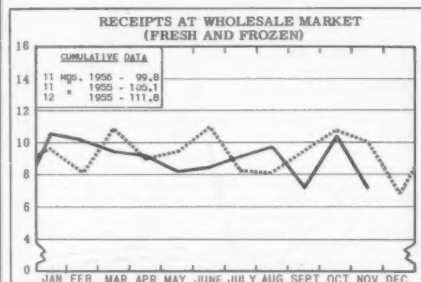
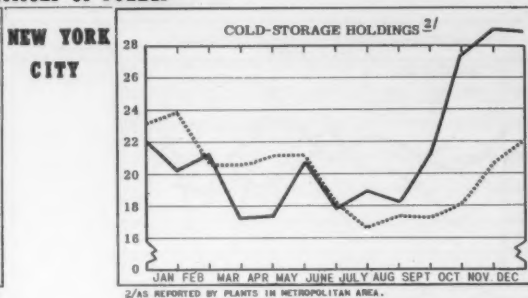
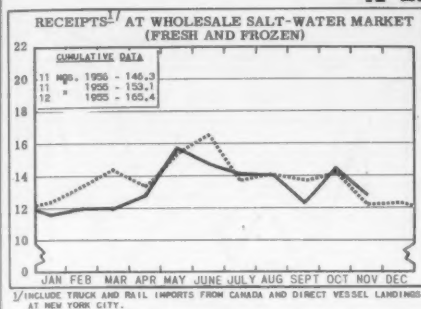


\*Excludes salted, cured, and smoked products.

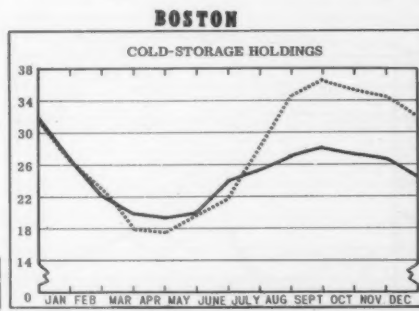
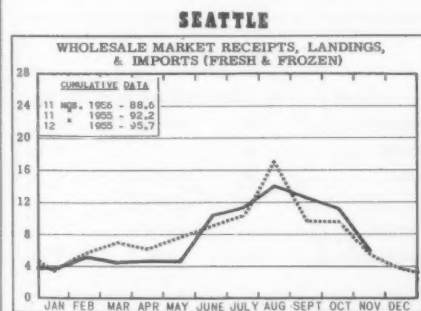
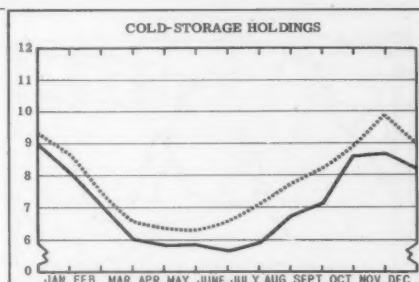


# CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

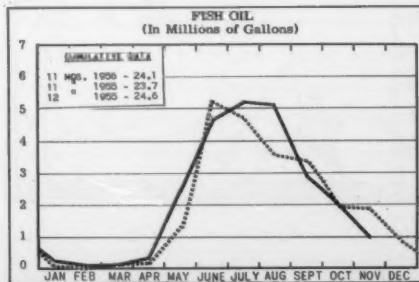
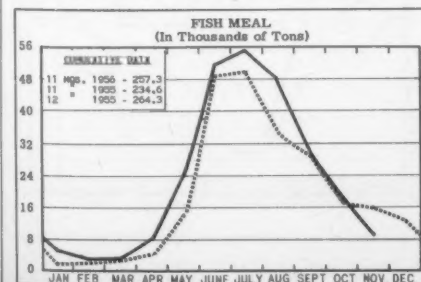
In Millions of Pounds



**CHICAGO**

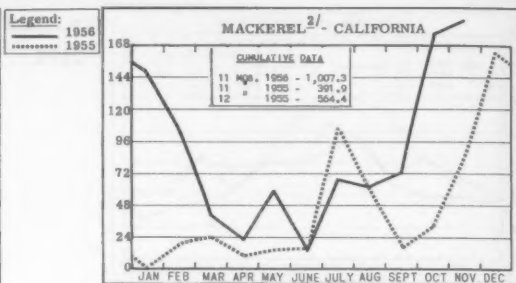
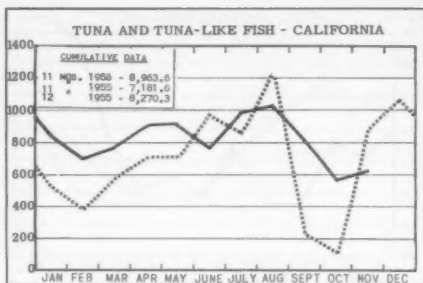


## CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

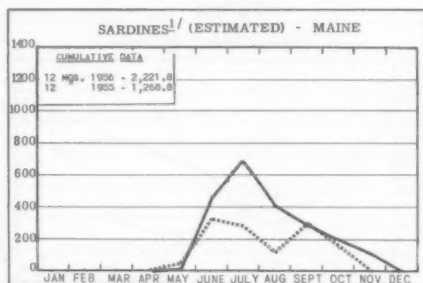
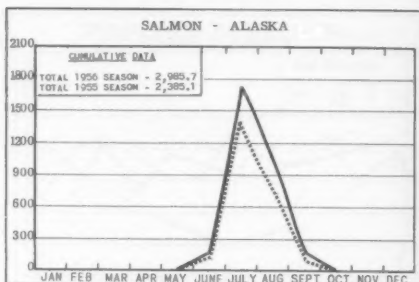
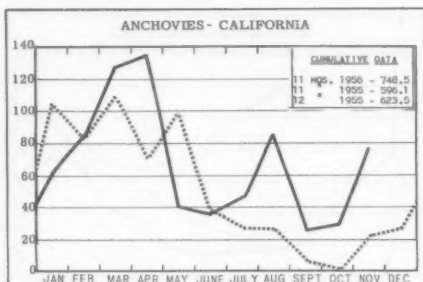


# CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases

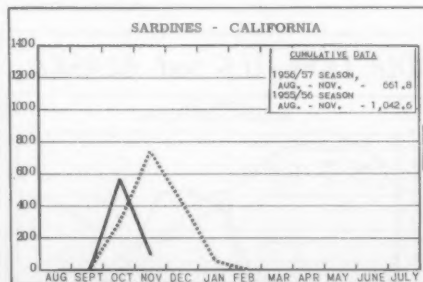


<sup>2/</sup>INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.

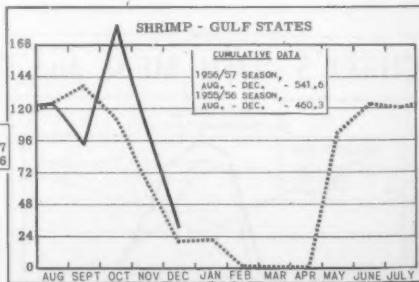


<sup>1/</sup>INCLUDING SEA HERRING.

STANDARD CASES			
Variety	No. Cans	Can Designation	Net Wgt.
SARDINES .....	100	$\frac{1}{2}$ drawn	3 $\frac{1}{2}$ oz.
SHRIMP .....	48	--	5 oz.
TUNA .....	48	No. $\frac{1}{2}$ tuna	6 & 7 oz.
PILCHARDS .....	48	No. 1 oval	15 oz.
SALMON .....	48	1-pound tall	16 oz.
ANCHOVIES .....	48	$\frac{1}{2}$ lb.	8 oz.

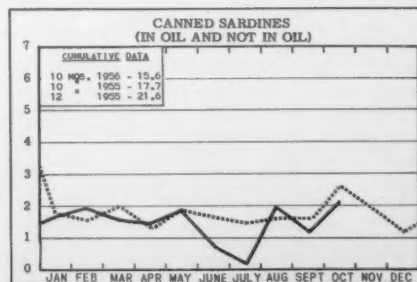
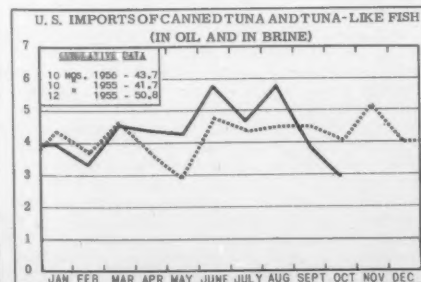
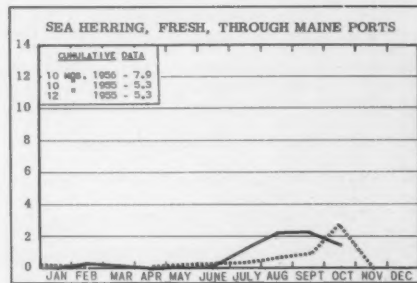
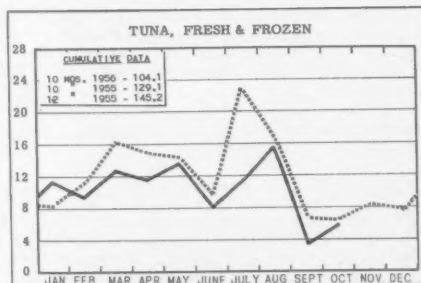
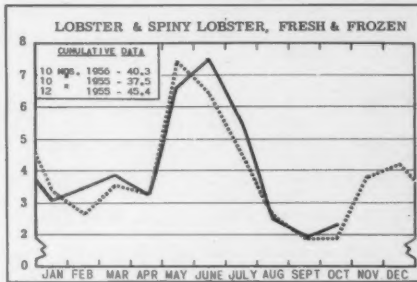
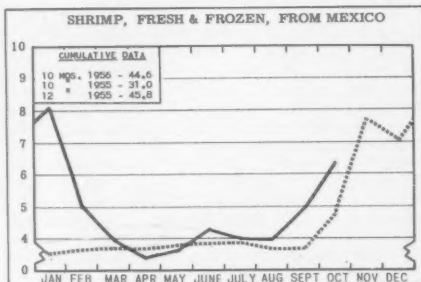
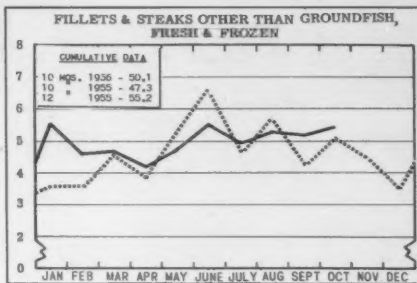
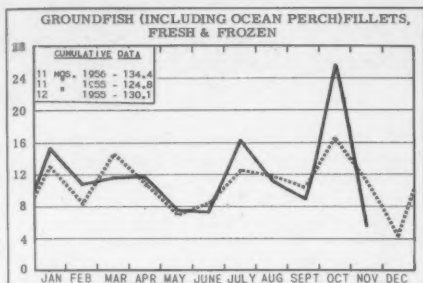


Legend: 1956/57 (solid line), 1955/56 (dotted line)



# CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds





# RECENT FISHERY PUBLICATIONS

## FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.  
SSR - FISH. - SPECIAL SCIENTIFIC REPORTS - FISHERIES (LIMITED DISTRIBUTION).  
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number       | Title  |
|--------------|--|
| CFS-1413     | Fish Stick Report, July to September 1956, 2 pp.   |
| CFS-1416     | North Carolina Landings, August 1956, 2 pp.  |
| CFS-1420     | Texas Landings (Revised), August 1956, 3 pp.   |
| CFS-1421     | Frozen Fish Report, September 1956, 8 pp.  |
| CFS-1422     | Florida Landings, July 1956, 6 pp.   |
| CFS-1425     | Mississippi Landings, July 1956, 2 pp.   |
| CFS-1426     | Massachusetts Landings, June 1956, 5 pp.   |
| CFS-1427     | Ohio Landings, September 1956, 2 pp.   |
| CFS-1428     | Fish Meal and Oil, September 1956, 2 pp.   |
| CFS-1429     | Shrimp Landings, August 1956, 4 pp.  |
| CFS-1430     | Alabama Landings, August 1956, 2 pp.   |
| CFS-1431     | North Carolina Landings, September 1956, 2 pp.   |
| CFS-1432     | Georgia Landings, September 1956, 2 pp.  |
| CFS-1433     | Texas Landings (Revised), September 1956, 3 pp.  |
| CFS-1434     | Mississippi Landings, August 1956, 2 pp.   |
| CFS-1435     | Frozen Fish Report, October 1956, 8 pp.  |
| CFS-1436     | California Landings, July 1956, 4 pp.  |
| CFS-1438     | New York Landings, August 1956, 4 pp.  |
| CFS-1439     | New York Landings, September 1956, 4 pp.   |
| CFS-1443     | Maine Landings, September 1956, 3 pp.  |
| Sep. No. 454 | Development of Markets for Underutilized Lake Erie Fish--Progress Report.  |
| Sep. No. 455 | Correlation of pH and Quality of Shucked Southern Oysters.   |
| Sep. No. 456 | Cold-Storage Life of Fresh-Water Fish--No. 3 (Lake Herring, Northern Pike, and Whitefish).   |
| Sep. No. 457 | <div style="display: inline-block; vertical-align: middle;">           Cold Storage Studies on Gulf of Mexico Yellowfin Tuna.<br/>           Fungicidal Properties of Modified Unsaturated Fish Oils.         </div> |
| Sep. No. 458 | North Atlantic Shrimp Keeping Quality in Cold Storage.   |

Sep. No. 459 - Technical Note No. 34 - Growth Characteristics of the Pink Yeast that Causes Discoloration of Oysters.

SSR-Fish. No. 174 - Size Variation of Central and Western Pacific Yellowfin Tuna, by Edwin S. Iversen, 28 pp., illus., processed, June 1956.

SSR-Fish. No. 183 - Observations on Serology of Tuna, by John E. Cushing Jr., 17 pp., processed, October 1956. (Also Contribution Hawaii Marine Laboratory No. 85.)

SSR-Fish. No. 187 - Commercial and Sport Shad Fisheries of the Edisto River, South Carolina, 1955, by Charles H. Walburg, 9 pp., illus., processed, October 1956. Describes the Edisto River, South Carolina, shad fishery investigations to determine fishing effort, fishing rate, total catch, size of run, and spawning escapement for 1955. The commercial fishery catch-and-effort data were obtained from logbooks kept by each fisherman. The total catch made by sport fishing was determined by a post-card survey. The catch-and-effort data were combined with a tagging and recovery program, and it was estimated that the fishing rate was approximately 20 percent, the total catch was 11,000 shad, and the size of the run was 56,000 shad (fiducial limits 28,000 to 100,000). Unfortunately, catch-and-effort records for previous years were not available for this stream; therefore, sizes of former runs and escapements could not be determined.

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fisheries Trends and Review for 1955, by V. J. Samson, 38 pp., processed. (Available free from the Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) This is a review of the 1955 trends and conditions in the California fisheries. Among the subjects discussed are the tuna fishery (cannery receipts, total pack for 1946-1955, ex-vessel prices, domestic catch and fishing conditions, imports of frozen tuna, and canned tuna market conditions and price quotations); California sardine (pilchard) fishery (landings, ex-vessel prices, canned pack, and canned sardine prices); mackerel fishery (cannery receipts and ex-vessel prices); anchovy fishery; and canned pet-food production. Included in the statistical tables are data on tuna receipts and canned pack by months and species; landings and products of sardines (pilchards) by months, products, and areas; landings and pack of mackerel and jack mackerel by species and months; production of miscellaneous fishery products; freezing of fish and shellfish; cold-storage holdings; landings of market fish and shellfish at certain

California ports; and imports of fishery products into California and Arizona.

Gulf States Production of Fishery Products for Selected Areas, 1955, by L. A. Keilman, 26 pp., processed, December 1956. (Available free from the U. S. Fish and Wildlife Service, 609-611 Federal Bldg., 600 South St., New Orleans 12, La.) The author discusses trends and conditions in Gulf Coast fisheries during 1955 and gives a resume of the individual fisheries: For the shrimp fishery a detailed account is given of general conditions, total landings, composition of the landings by species, increase in consumption, prices, canned shrimp, and data on cold-storage freezings and holdings. Production and market conditions for the oyster, blue crab, and finfish fisheries are included in the summary, as well as significant developments in these fisheries. Imports of fresh and frozen fish are briefly mentioned. Statistical tables show shrimp closed seasons in effect in Gulf states in 1955; minimum shrimp size regulations; conversion factors and container capacities; shrimp sizes; total landings by area; total landings of selected areas and species by months; fishery imports through the New Orleans Custom District and Port Isabel and Brownsville, Texas; and weekly canned oyster and shrimp packs. Included also are tables showing the monthly range of wholesale prices of fishery products on the New Orleans French Market, a summary of Gulf shrimp landings for selected areas, monthly LCL shipments from New Orleans by month and by destination, and fishery products market classifications in the Gulf area. The areas covered by the report are: Mobile and Bayou LaBatre, Ala.; Pascagoula and Biloxi, Miss.; New Orleans and lower Mississippi River area, Golden Meadow area, Houma, Chauvin, Dulac, Morgan City, Berwick, Patterson, and Delcambre, La.; Galveston, Freeport, Port Lavaca, Palacios, Aransas Pass, Rockport, Corpus Christi, Port Isabel, and Brownsville, Tex.

Receipts of Fresh and Frozen Fishery Products at Chicago, 1955, by G. A. Albano, 53 pp., processed, November 1956. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 565 West Washington St., Chicago 6, Ill.) This report presents an analysis of the marketing trends for fresh and frozen fishery products and statistical tables on the receipts of fresh and frozen fish and shellfish at Chicago during 1955. Statistics on arrivals of fishery products at Chicago are presented by species and by states and provinces of origin; states and provinces by species; species by months; states and provinces by months; totals by species; and totals by states and provinces. Receipts are tabulated by methods of transportation (truck, express, and freight). A table shows the monthly range of wholesale prices of some of the leading varieties of fresh and frozen fishery products handled on the Chicago market. In the analysis of the marketing trends for fresh and frozen fishery products at Chicago, the author discusses the sources of the receipts, methods of transportation, months of greatest receipts, receipts by species and varieties, lake trout and whitefish receipts,

U. S. Great Lakes fishery production, U. S. imports of fresh and frozen fish from Canada, U. S. imports of frozen fillets and cold storage inventories. Also included is a table giving the names, classifications, and approximate weights of certain fishery products sold in the Chicago wholesale market.

Boston Fishery Products Monthly Summary, September 1956, 15 pp.; Boston Fishery Products Monthly Summary, October 1956, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Landings and ex-vessel prices by species for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; and Boston frozen fishery products prices to primary wholesalers; for the months indicated.

(Chicago) September 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, 10 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp and frozen fillet wholesale market prices; for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, October 1956, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shellfish on the New Orleans French Market; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, October 1956, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.) Fishery production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Ocean City, and Cambridge; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

(New York) Monthly Summary - September 1956 - Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Receipts in the salt-water section of the Fulton Fish Market by species and by states and provinces for the month indicated.

(Seattle) Monthly Summary - Fishery Products, October 1956, 6 pp. (Market News Service, U. S. Fish and Wildlife Service, 421 Bell St. Terminal, Seattle 1, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Oregon) wholesale dealers; also Northwest Pacific halibut landings.



Progress in Developing Methods for Chemical Control of Molluscan Enemies, by V. L. Loosanoff, vol. 20, Bulletin No. 12, November 7, 1956, 5 pp., processed. (Available free from the Fish and Wildlife Service, Marine Biological Laboratory, Milford, Conn.) Answers requests for more information concerning the development of methods for chemical control of shellfish enemies. Discussed briefly are the effects of various chemicals on molluscan enemies, methods of using chemicals, effects of chemicals on useful animals, and significance of the application of the methods being developed.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Comparative Study of Food of Bigeye and Yellowfin Tuna in the Central Pacific, by Joseph E. King and Isaac I. Ikehara, Fishery Bulletin 108 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 57), 26 pp., illus., printed, 30 cents, 1956.

Propagation and Distribution of Food Fishes for the Calendar Years 1953-1954, Statistical Digest 38, 39 pp., printed, 20 cents, 1956.

This is a Salmon Hatchery (Circular 25), This is a Trout Hatchery (Circular 31), This is a Pondfish Hatchery (Circular 40); pamphlets each 2 pp., illus., printed, 5 cents. The purpose of the circulars is to portray in a quick, easy-to-read manner the function, operation and physical features of each of the three types of hatchery. Each circular is illustrated with photographs of a typical hatchery and with artist's drawings which portray the life cycle of various fish and some of their physical characteristics. Hatchery operations are shown by both photograph and drawings. The circulars show that the pondfish hatchery is a group of rearing ponds, each about an acre in extent, while trout and salmon hatcheries have batteries of concrete raceways or rearing ponds each about 8 feet by 80 feet in area. A feature of some salmon hatcheries is the fish ladder from the stream to spawning and holding ponds in addition to the concrete raceways. Each leaflet explains the cultural methods used for the species and the manner in which the hatchery product helps solve the particular fishery problem. The pondfish produced are mostly largemouth bass and blue gills and, to a lesser extent, other warm-water fish like smallmouth bass, redear sunfish, northern pike, walleye, and channel catfish. Rainbow, brown, cutthroat and brook trout provide much of the sport fishing in the United States and account for most of the production from trout hatcheries. There are five species of salmon native to the Pacific area, the king (chinook, spring); red (sockeye, blueback); silver (coho); chum (dog) and pink (humpback). All species except pink salmon are reared in Federal hatcheries in the Northwest. In some instances there are facilities for both trout and pondfish culture at the same hatchery and in others the salmon and trout are reared in a single installation.

## MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

Abstract of Commercial Fisheries Laws of California, 1955-1957, folder, 2 pp., printed. Department of Fish and Game, Sacramento 14, Calif.

"Age Determination in Yellowstone Cutthroat Trout by the Scale Method," by Martin Laakso and Oliver B. Cope, article, The Journal of Wildlife Management, vol. 20, no. 2, April 1956, single copy \$2. Cayuga Press, Inc., 113 East Green St., Ithaca, N. Y.

Annual Report--Passage of Fish over Bonneville and McNary Dams, Columbia River, Oregon and Washington, 1955, Reports Control Symbol NPDGW-79, Chief of Engineers, U. S. Army, Washington 25, D. C.

Beretning om Selfangsten, Hakjerringfisket og Overvintringsekspedisjonene i 1955 (Report on Sealing, Greenland Shark Fishing, and Winter Expeditions in 1955), Arsberetning Vedkommende Norges Fiskerier, 1955, Nr. 10, 23 pp., printed in Norwegian. A. S. John Griegs Boktrykkeri, Bergen, Norway, 1956.

The Boring Sponges which Attack South Carolina Oysters, with Notes on Some Associated Organisms, by Sewell H. Hopkins, Contributions from Bears Bluff Laboratories No. 23, 30 pp., illus., printed, Bears Bluff Laboratories, Wadmalaw Island, S. C., October 1956.

Bulletin Officiel D'Information du Conseil Supérieur de la Pêche (Official Information Bulletin of the Council on Fisheries), No. 25, July-August-September 1956, 93 pp., printed in French. Conseil Supérieur de la Pêche, 1 Avenue de Lowendal, Paris, France.

(Canada) Ninth Annual Report of the Fisheries Prices Support Board for the Year 1955-56, 10 pp., printed. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1956. Describes the Fisheries Prices Support Act; economic conditions of the British Columbia, Atlantic Coast, and fresh-water fisheries; price support program for Newfoundland salted codfish; request for assistance in the destruction of Pacific Coast dogfish; and other activities of the Board.

Changes in the Physiography of Oyster Bars in the James River, Virginia, by Nelson Marshall, Contribution No. 17, 10 pp., illus., printed. (Reprinted from The Virginia Journal of Science, vol. 5, New Series, no. 3, July 1954, pp. 173-181.) The Oceanographic Institute, Florida State University, Tallahassee, Fla.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATIONS ISSUING THEM.

The Charles F. Johnson Oceanic Gamefish Investigations, Summary of Investigations for the Period Comprising September, 1955 through August, 1956, by Gilbert L. Voss, Progress Report No. 2, 11 pp., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla. A summary of investigations of the systematics, geographical distribution, ecology, food, migrations, spawning, and growth of the billfishes (including spearfishes, marlins, and the swordfish).

Cod Populations--Identified by a Chemical Method, by Eva Henly Dannevig, Fiskeridirektoratets Skrifter (Report on Norwegian Fishery and Marine Investigations, vol. XI, no. 6), 13 pp., illus., printed. A. S. John Griegs Boktrykkeri, Bergen, Norway, 1956. Gives the results of a study of the proteins of fish muscle. The chemical composition of the muscle of cod varies according to the different localities. First, there is a very definite difference in the chromatographic pattern of cod muscle between cod from the southern waters (Skagerack) and those from northern waters (Lofoten area). This difference occurred in all specimens examined, irrespective of local varieties. Secondly, the cod from the two localities can be separated in subgroups. Finally, the cod muscle has been hydrolyzed, and the different constituents building the complex molecules of the amino-acid group containing part of the muscle are identified.

"Correlations of Various Ambient Phenomena with Red Tide Outbreaks on the Florida West Coast," by Anita Feinstein, article, Bulletin of Marine Science of the Gulf and Caribbean, vol. 6, no. 3, September 1956, pp. 209-232, illus., printed. The Marine Laboratory, University of Miami, Coral Gables 34, Fla.

"The 'Critical Period' in the Early Life History of Marine Fishes," by John C. Marr, article, Journal du Conseil, vol. XXI, no. 2, April 1956, pp. 160-170, illus., printed, single copy Kr. 12.00 (US\$2.32). Andr. Fred. Høst & Søn, Bredgade, Copenhagen, Denmark.

The Distribution of Fishes Found Below a Depth of 2,000 Meters, by Marion Grey, Fieldiana: Zoology, vol. 36, no. 2, 263 pp., printed, \$4. Chicago Natural History Museum, Roosevelt Rd. and Lake Shore Dr., Chicago 5, Ill.

El Agricultor Venezolano (The Venezuelan Farmer), vol. XXI, no. 190, August-September 1956, 78 pp., illus., printed in Spanish. Ministerio de Agricultura y Cría, Caracas, Venezuela. Contains, among others, the following articles: "Fishing in Venezuela," "Oceanography of the Central Region," "20 Years of the Department of Fishery," "Pearl Fishing," and "The Fish Service Provided by the Ministry of Agriculture and Livestock."

"Fish in the Mink Diet," article, Trade News, vol. 9, no. 3, September 1956, pp. 6, 12, illus., printed. Department of Fisheries of Canada, Ottawa, Canada. An interesting development in British Columbia is the increasing use of

fish as a food for mink. This increase is due to its availability and price in comparison to other animal foods, its nutritive value, and to the growth in the number of mink ranchers in the province during recent years. This article describes a study of the subject made by the Markets and Economics Service of the Department of Fisheries.

Fishes from Eylath (Gulf of Aqaba), Red Sea, Second Report, by H. Steinmetz and A. Ben-Tuvia, Bulletin No. 11, December 1955, 11 pp., printed. The Government Printing Press, Haifa, Israel.

Fiskeri-Undervisningen, 1954-55 (Fisheries Training, 1954-55), Arsberetning Vedkommende Norges Fiskerier, 1955, Nr. 8, 37 pp., illus., printed in Norwegian. A. S. John Griegs Boktrykkeri, Bergen, Norway, 1956.

Fiskeriinspektorenes Virksomhet 1/7 1953--31/12 1954 (Activities of Fisheries Inspectors, July 1, 1953--December 31, 1954), Arsberetning Vedkommende Norges Fiskerier, 1955, Nr. 11, 139 pp., printed in Norwegian. A. S. John Griegs Boktrykkeri, Bergen, Norway, 1956.

(FAO) Conservation et Distribution des Produits de la Pêche (Preservation and Distribution of Fish Products), by Giorgio Ricci, Technical Paper No. 43, 10 pp., processed in French with brief abstract in English. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. A paper presented at the Fourth Meeting of the General Fisheries Council for the Mediterranean held in Istanbul September 17-22, 1956, covering the use of ice in the preservation of fish, refrigeration equipment, quick-freezing, distribution of refrigerated fishery products, retail stores, and distribution of frozen fishery products.

(FAO) Transport of Fish for Short Trips by Sea at Medium Temperature, by Selim R. Suntur, Technical Paper No. 47, 4 pp., processed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. A paper presented at the Fourth Meeting of the General Fisheries Council for the Mediterranean held in Istanbul September 17-22, 1956.

Gremio dos Armadores da Pesca da Baleia, Relatório e Contas do Exercício de 1955 e Oramento para 1956 (Whaling Vessel Owners' Guild, Statement of Operations for 1955 and Budget for 1956), 28 pp., illus., printed in Portuguese. A Comissão Revisora de Contas, Lisbon, Portugal.

Gremio dos Armadores da Pesca da Sardinha, Relatório e Contas do Exercício de 1955 e Oramento para 1956 (Sardine Fishing Vessel Owners' Guild, Statement of Operations for 1955 and Budget for 1956), 15 pp., printed in Portuguese. A Comissão Revisora de Contas, Lisbon, Portugal.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATIONS ISSUING THEM.

Gremio dos Armadores de Navios da Pesca do Bacalhau, Relatório e Contas do Exercício de 1955 e Orcamento para 1956 (Cod Fishing Vessel Owners' Guild, Statement of Operations for 1955 and Budget for 1956), 28 pp., printed in Portuguese. A Comissao Revisora de Contas, Lisbon, Portugal.

Inter-American Tropical Tuna Commission Annual

Report for the Year 1955 (Comision Interamericana del Atun Tropical Informe Anual Correspondiente al Ano 1955), 95 pp., illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1956. Included in this report are: the recommended program of investigations; progress on investigations; publication of research results; activities of the Tuna Commission at the International Technical Conference on the Conservation of the Living Resources of the Sea; and a short resume of the Commission's regular annual meeting at Panama City, Panama, on July 14, 1955. An appendix to the report describes the investigations conducted by the Commission during 1955, and discussed in this section are the compilation of current statistics of total catch, amount and success of fishing, and abundance of fish populations; compilation and analysis of historical data on tuna and bait fishes; research on biology, life history, and ecology of tunas; investigation of the oceanography of the Eastern Pacific; and investigations of the biology, ecology, and life history of bait fishes. The Commission has the purpose of gathering and interpreting the factual information required for maintaining the populations of tuna and tuna bait fishes at such levels which will permit maximum sustainable catches year after year.

Kieler Meeresforschungen (Marine Investigations),

Band XII, Heft 2 (vol. XII, no. 2), 1956, pp. 127-260, illus., printed in German. Institut für Meereskunde der Universität, Hohenbergstr. 2, Kiel, Germany. Contains nine articles on various subjects including biological, historical, oceanographic subjects, and problems observed in various parts of the world.

"The Lamprey in New York Waters," by John R. Greeley, article, The New York State Conservationist, vol. II, no. 1, August-September 1956, pp. 18-21, illus., printed, single copy 50 cents. The Conservationist, Room 515, Arcade Bldg., Albany 1, N. Y.

Lofotfisket 1955 (Lofoten Fisheries, 1955), Arsberetning Vedkommende Norges Fiskerier, 1955, Nr. 5, 96 pp., printed in Norwegian. A. S. John Griegs Boktrykkeri, Bergen, Norway, 1956.

Memoirs of the Faculty of Fisheries, Kagoshima

University, vol. 3, no. 2, 88 pp., illus., printed in Japanese with summaries in English. The Faculty of Fisheries, Kagoshima University, Kagoshima, Japan, May 1954. Contains among others the following articles: "On the Fisheries of Tuna and the Oceanographic Conditions in the Sawu Sea;" "Studies on the Relation Between the Fluctuation in Catch and the

Environmental Factors of the Principal Fisheries in Kagoshima Bay. I. On the Water-Temperature and Salinity Concerning the Catch 'Maiwashi,' *Sardinia melanosticta*, and 'Urume,' *Etrumeus micropus*;" "Studies on the Horizontal Finding of Fish School. (III) About Errors of 'Reading' on the Records of General Fish Finder;" "On the Variation of Free-Tyrosine Content of Fish Meat in Decrease of Its Freshness--II. Estimation of Tyrosine Value under Application of Xanthoproteic Reaction;" "Chemical Studies on the Fixative Procedure of Fish Meat for the Various Estimation--I. (I) On the Fixative Procedure for the Estimation of Volatile Basic Nitrogen. (a) Fixation by Using Protein Precipitant;" "Study on the Separating Process of Histamin from Histidine by the Electro-Chromatographic Method;" "Biochemical Studies on the Mould Isolated from Katsuobushi--I. On the Antibiotic Action of the Mould;" "A Survey on the Constitutional Transformation of a Fishing Village;" and "An Interpretation of the Developmental Process of Fishery Economy in Japan--Especially a Consideration on the Bonito Fishery at Bonotsu."

Memoirs of the Faculty of Fisheries, Kagoshima

University, vol. 4, 159 pp., illus., printed in Japanese with summaries in English. The Faculty of Fisheries, Kagoshima University, Kagoshima, Japan, December 1955. Contains among others the following articles: "Studies on the Improvement of Yellow-tail Setting Net (II). Model Experiment on Trap Nets of Variant Constructions;" "On the Curve of Tuna Long Line;" "Studies on the Relation Between the Fluctuation in Catch and the Environmental Factors of the Principal Fishes in Kagoshima Bay--II. In the Fisheries of *Istiophorus orientalis* and Sea Conditions;" "On the Detective Effect of the Radar Upon the Location of the Tunny Longline;" "An Experiment on the Trial Manufacture of Lead Plate Depth Finder for Fishing Tools;" "Fundamental Studies on the Relation of Underwater Sound to the Fish Behaviour. (I) About the Sounds by Dropping or Showering;" and "Chemical Studies on the Fixative Procedure of Fish Meat for the Various Estimations. (II) On the Fixative Procedure for the Estimation of Volatile Basic Nitrogen. b. On the Volatile Nitrogen Produced in Fish Meat Fixed in Acidic Protein Precipitant."

The Migration and Exploitation of the Black Mullet,

MUGIL CEPHALUS L. in Florida, as Determined from Tagging During 1949-1953, by Gordon C. Broadhead and H. P. Mefford, Technical Series No. 18, 32 pp., illus., printed. The Marine Laboratory, University of Miami, Coral Gables, Fla., April 1956.

The Movement and Recovery of Tagged Walleyes

in Michigan, 1929-1953, by Paul H. Eschmeyer and Walter R. Crowe, Miscellaneous Publication no. 8, 32 pp., illus., printed. Institute for Fisheries Research, Ann Arbor, Mich., 1955.

"The Occurrence of *Gymnodinium brevis* in the Western Gulf of Mexico," by W. B. Wilson

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

and S. M. Ray, article, *Ecology*, vol. 37, no. 2, p. 388, printed, April 1956, single copy \$2. Duke University Press, Box 6697, College Station, Durham, N. C.

(Oregon) *Biennial Report of the Fish Commission of the State of Oregon to the Governor and the Forty-Eighth Legislative Assembly, 1955*, 28 pp., printed. Oregon Fish Commission, 307 State Office Bldg., Portland 1, Ore. A report of the operation of the Fish Commission of the State of Oregon together with a financial statement for the period July 1, 1952, to June 30, 1954. It describes the efforts of the Fish Commission which have been directed toward increasing the effectiveness of the fisheries management activities. This has been done by improved operating methods and the construction of new facilities. This report also shows the pack of canned salmon on the Columbia River from the inception of the industry to 1953.

"Organoleptic Studies of Irradiated Foods," by G. B. Pratt and O. F. Ecklund, article, *Food Technology* (Published by the Institute of Food Technologists), vol. 10, no. 10, October 1956, pp. 496-499, printed. The Garrard Press, 119 West Park Ave., Champaign, Ill. Discusses and gives results of organoleptic studies of irradiated meats and vegetables. Statistical analysis of taste test scores showed significant off-flavor in each of the irradiated meats and vegetables in the experiment. In every case important changes in appearance or flavor developed on storage. According to the authors, some of these changes, but by no means all, might be attributed to enzymatic action.

*Oyster Cultivation in Britain (A Manual of Current Practice)*, by H. A. Cole, 45 pp., illus., printed, 5s. (70 U.S. cents). Her Majesty's Stationery Office, London, England, 1956. An attempt is made to give a straightforward account of the various methods of oyster culture at present followed in Britain and to indicate lines along which further development is possible. Although the work is particularly addressed to anyone contemplating oyster farming, either on a large or small scale, and special attention is given to difficulties likely to be encountered, a full description is also given of those new techniques worked out at home or abroad, which are considered to be of value to British oyster planters. Contains chapters on suitable areas for development; sewage and industrial pollution; legal considerations; equipment and methods of cultivation; seasonal work on an oyster fishery; copper taints in oysters; the purchase of oysters for relaying and restocking; the making of new oyster beds and the reclamation of derelict grounds; frost; the cultivation of Portuguese oysters; and the food value of oysters.

*Partners in World Trade (The Goal of the GATT)*, Department of State Publication 5879, Commercial Policy Series 148, 19 pp., illus., printed, 15 cents. Department of State, Washington, D. C. (For sale by the Superintendent

of Documents, Government Printing Office, Washington 25, D. C.)

(Philippines) *Fisheries Statistics of the Philippines, 1953*, illus., printed. Bureau of Fisheries, Manila, Philippines.

"Pothead Roundup," by Mark Ronayne, article, *Trade News*, vol. 9, no. 3, September 1956, pp. 3-5, illus., printed. Department of Fisheries of Canada, Ottawa, Canada. Describes the most recent developments in the Newfoundland pothead whale fishery. The pothead whales are driven into a "corral" at New Harbour, from the outer areas of Trinity Bay where they are allowed to roam at will until they are selected for killing. This latest development phase is reflected in the rows of aluminum-covered sheds which nestle almost out of sight in fir and spruce stands along the road to Dildo. Once virgin forest, a large part of this area has been transformed almost overnight into a bustling mink-ranching center which provincial authorities are hopeful will some day develop into one of the continent's largest. They base these predictions on the abundance of pothead whales and codfish which, barring unforeseen and unlikely changes, can be expected to provide feed supplies for hordes of mink that nobody would dare estimate at this time.

*Progress Reports of the Pacific Coast Stations*, No. 106, 28 pp., illus., printed. Fisheries Research Board of Canada, Ottawa, Canada, September 1956. Among the articles included are: *Storage of Live Crabs in Refrigerated Sea Water*, by S. W. Roach; *Effect of Chlortetracycline Treatment of Fish on Development of Certain Food-poisoning Bacteria*, by H. M. Bluhm and H. L. A. Tarr; *Results of Tests on Kuralon Staple Twine*, by P. J. G. Carrothers; *Distribution and Movement of Young Pacific Salmon During Early Ocean Residence*, by J. I. Manzer.

"Quality of Sardines (*Clupea pilchardus* Walb.) Held Unfrozen and Frozen Prior to Canning," by W. A. MacCallum, W. J. Dyer, S. Curi, J. J. Simoncic, M. Kovacevic, D. C. Horne, R. J. McNeill, M. Drvaric, and H. Lisac, article, *Food Technology* (Published by the Institute of Food Technologists), vol. 10, no. 9, September 1956, pp. 432-438, illus., printed. The Garrard Press, 119 West Park Ave., Champaign, Ill. Gives the results of tests made on the quality of sardines, *Clupea pilchardus*, held unfrozen and frozen prior to canning. Prior to canning, the fresh chilled fish, the stored unfrozen fish, and the fish thawed after removal from frozen storage were examined organoleptically and peroxide determinations were made. The following tests of canned fish were made: (a) organoleptic examination; (b) determination of peroxide value; (c) determination of free fatty acids; and (d) determination of salt. The authors report the following conclusions and recommendations: "Sardines, to be of good canning quality, should be iced in boxes within two or three hours of catching in a manner which prevents crushing.



THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Fish handled in this manner should be held no longer than three days in unfrozen storage prior to canning. Evisceration of sardines prior to storage is not necessary once these conditions are observed. After the sardines are cooled and placed in storage at 30° to 31° F. (-1.1 to -0.5 C.), the presence or absence of ice over the fish does not affect the quality of the fish for canning. Only strictly fresh sardines, iced and handled as specified, should be frozen for later canning. Glazed and unglazed air-frozen sardines can be held at a temperature of -4° F. (-20° C.) in a condition acceptable for canning for a period of up to one month. A storage temperature of about -20° F. (-29° C.) is recommended for use in commercial practice. Organoleptic examination of the fish meat both prior to and after canning is recommended to give a proper assessment of quality for canning.

"Quality Variables Pinpointed for Fish-Stick Makers," by Stephen J. Lirot and John T. R. Nickerson, article, *Food Engineering*, vol. 28, no. 6, June 1956, pp. 88-90, 189, illus., printed, McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N. Y. Describes a study of the effect processing and coating ingredients have on the quality of frozen precooked fish sticks. Results show that: (1) there is a highly significant correlation between subjective color grading and spectrophotometer reflectance values in the red portion of the spectrum for sticks fried in oil, frozen, then defrosted and oven-heated for 15 minutes at 400° F. Further taste-panel scores indicate a preference for sticks with shades in the central portion of the range, neither too light nor too dark; (2) percent over-all breading and batter pickup of uncooked sticks appears to vary linearly with the logarithm of both batter viscosity and percent frying weight loss. The latter increases as over-all pickup decreases; (3) coating performance is greatly affected by the specific flour or flour combinations used in the batter; (4) above 3 percent, increasing concentrations of egg yolk solids in the batter reduces its viscosity and over-all pickup by uncooked sticks; and (5) compared with batter containing 3-percent egg solids, one with no egg solids produces slightly greater fat absorption and weight loss during frying. A concentration of less than 3-percent egg solids in batter mixtures may be desirable.

Report of the Food Investigation Board with the Report of the Director of Food Investigation for the Year 1955, 85 pp., printed, 4s. (56 U.S. cents). Her Majesty's Stationery Office, London, England, 1956. Contains, among others, a report concerning research work undertaken at the Torry Research Station, Aberdeen, and the Humber Laboratory, Hull. Discusses improvement in quality of iced white fish, freezing and cold storage, smoke curing, drying, fishery byproducts, bacteriology, and biochemistry. It mentions experiments with fish containers; electrostatic smoking of herring; smoke production and its control by means of a "fluidizer;" and the fact that the recording optical-density smoke-meter (the Torry Smoke-

meter) is now being manufactured commercially. The report states that, "it is believed this instrument will have wider application than in the smoke-curing of foods."

Revue des Travaux de L'Institut des Pêches Maritimes (Review of the Studies of the Marine Fisheries Institute), vol. XX, no. 2, June 1956, pp. 119-220, illus., printed in French, Institut Scientifique et Technique des Pêches Maritimes, 59 Avenue Raymond-Poincaré, Paris 16, France. Includes articles on the study of the scallop (*Chlamys varia* L.); acclimatization of the clam (*Venus mercenaria* L.) to Brittany; breeding of Portuguese oysters on rafts; and statistics on the French fisheries for 1954 by species and fishing area.

Scientists Stalk Oyster Killers, 16 pp., illus., printed. (Reprinted from *The Humble Way*, a publication of the Humble Oil & Refining Co.) Humble Oil & Refining Co., Houston, Texas. Presents a brief history of oyster mortalities in different parts of the world; a description of a Louisiana oyster operation; contrasts in marketing; and environment and enemies of oysters. Also describes oyster research work to determine whether or not oil operations would contribute to oyster mortality. After many years of hard work, scientists working independently of each other, and representing divergent interests, have proved that the real oyster killer is a parasitic fungus which flourishes under conditions found most of the year in Louisiana waters. Scientists found that parasite, studied its devastating effect on oysters, and agree that it is the major cause of oyster mortality in Louisiana.

"Some Effects of Specific Organic Compounds on Marine Organisms," by Albert Collier, Sammy Ray, and W. B. Wilson, article, *Science*, vol. 124, no. 3214, August 1956, p. 220, printed, single copy 25 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave., NW., Washington 5, D. C.

"Some Factors Affecting the Sodium Chloride Content of Haddock During Brine Freezing and Water Thawing," by J. Holston and S. R. Pottinger, article, *Food Technology*, vol. 8, no. 9, pp. 409-414, illus., printed, single copy \$1. The Garrard Press, 119 West Park Ave., Champaign, Ill.

"Spawning and Egg Production of Oysters and Clams," by H. C. Davis and P. E. Chanley, article, *The Biological Bulletin*, vol. 110, no. 2, April 1956, pp. 117-128, illus., printed, single copy \$2.50. Lancaster Press, Inc., Prince and Lemon Sts., Lancaster, Pa.

"Stranded Mammals of the Sea," article, *The New York State Conservationist*, vol. 11, no. 1, August-September 1956, pp. 4-5, illus., printed, single copy 50 cents. The Conservationist, Room 515, Arcade Bldg., Albany 1, N. Y.

Technical Report of Fishing Boat, No. 9, 232 pp., illus., printed in Japanese with brief English



THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATIONS ISSUING THEM.

abstracts. Fishing Boat Laboratory, Production Division, Ministry of Agriculture and Forestry, Kasumigaseki, Chiyodaku, Tokyo, Japan, September 1956. Contains the following reports, with very brief abstracts in English, on various studies in progress at the Fishing Boat Laboratory: (1) "A Note of Fishing Boat Stability (Report No. 1, Medium Type Boat);" (2) "Study of Fish Hold Insulation Materials;" (3) "Wear of Cylinder of etc. Fishing Boat-IX (Effect on Temperature of Cooling Water No. 2);" (4) "Automatic Net-Height Meter Measuring Simultaneously Two Points of the Trawl Net, and Results of Experiments for these Apparatuses;" (5) "Study on Reflection Loss of Ultrasound Millimeter Wave on Fish-Body;" (6) "Study on Fish-Finder for Ground-Fish (Report No. 1 - Technical Examination and Experiment on Fish-Finder for Ground-Fish);" (7) "Study on Fish-Finder for Ground-Fish (Report No. 2 - Study on Finding of Ground-Fish by 50 kc. Fish-Finder);" (8) "Study on Fish-Finder for Ground-Fish (Report No. 3 - Study on Detection of Ground-Fish by 200 kc. Fish-Finder);" (9) "Study of DSL by Ultrasonic Wave (2);" (10) "Investigation of Sea-Noise;" and (11) "Study on Measurement of Under-Water Noises at Kurihama Bay." An appendix lists the reports published in the past, Nos. 1-8.

"Temperature Measurements on Frozen Fish During Road Transport," by D. L. Nichol and J. Lawrence, article, Modern Refrigeration, vol. LIX, no. 702, September 1956, pp. 316-319, illus., printed, 3s. (42 U.S. cents). Refrigeration House, Victoria Road, Woking Surrey, England. This paper is concerned with temperature measurements in a large road container operating under normal commercial conditions. The time/temperature relationship for the cold storage of white fish was established. Results of test indicate that a block of fish which has become heated from 0° F. to +15° F. over 24 hours, provided that it is returned to cold storage at 0° F. and cooled fairly rapidly, will only have suffered deterioration equivalent to about 3 days in storage. With the type of container described even this small deterioration represents the extreme case, that of the most exposed blocks during a journey in very hot weather. The effect upon the majority of the load will be very much less. With insulated containers of this type there is clearly no need to provide refrigeration in transit for journeys of up to 26 hours. The work, however, does indicate that if a refrigerated container were being designed (e.g. for longer journeys) it would be particularly necessary to provide cooling at the edges and corners of the load. Clearly the provision of refrigeration in the air spaces above the load whether by cooling coils or by the use of solid carbon dioxide would not be an efficient method of cooling the bottom edges and corners.

(Texas) Game and Fish Laws, 1955-1956, compiled by Erma Baker, 319 pp., printed. Game and Fish Commission, Austin, Texas, September 1, 1955. Contains the full text of the game, fish, and fur laws of Texas for 1955-1956.

Two of its chapters are devoted to the (1) fresh-water fishing laws and (2) salt-water and commercial fishing laws.

"Underwater Observations on Escallop (*Pecten maximus* L.) Beds," by R. H. Baird and F. A. Gibson, article, Journal of the Marine Biological Association of the United Kingdom, vol. 35, no. 3, October 1956, pp. 555-562, illus., printed, single copy US\$7. Cambridge University Press, 32 East 57th St., New York 22, N. Y. This article describes the equipment and methods used in underwater observations of scallop beds, and the movement and distribution of scallops, and it gives a comparison of catches by diving and dredging. The authors state that, "Present methods of dredge sampling of escallop beds are unsatisfactory where all age-groups require to be studied. Selectivity by the dredge is continued above the point that might reasonably be expected from mesh size and tooth spacing, the latter being the primary selecting agent. A dredge without teeth and with a fine mesh bag fills with sand and bottom material within a short distance. As the mean density of escallops is low, even on good commercial beds, this results in very small catches. Escallops of all age-groups are present together on the beds with a tendency towards very localized age grouping, which would not be apparent in dredge sampling. There is no evidence that migration from feeder beds occurs. There is little apparent escape reaction; the limited reactions seen occurred most often among 0- and 1-group escallops. Dredge efficiency is low, the Irish dredge used being on the bottom for only a part of the time that it was moving, progression occurring in a series of long shallow leaps. Conservation of stocks of escallops would be most effective if based on dredge-tooth spacing and size rather than on the size of mesh or rings forming the belly of the dredge."

Utilizing Stock Tanks and Farm Ponds for Fish, by Marion Toole, Bulletin 24, 53 pp., illus., printed. Game and Fish Commission, Austin, Texas.

White Fish Authority, Fifth Annual Report and Accounts for the Year Ended 31st March, 1956, 51 pp., printed, 2s. (28 U.S. cents). Her Majesty's Stationery Office, London, England. Presents a general description of the White Fish Authority, its functions, income, and expenditures. Sections on production of fishery products, marketing and distribution, research and experiments, training courses, and investigations are also presented.

The World's Best Fishin' Hole, by J. L. McHugh, 8 pp., illus., printed. (Reprinted from the Bulletin of the International Oceanographic Foundation, vol. 1, no. 2, May 1955.) The Marine Laboratory, University of Miami, 439 Anastasia Avenue, Coral Gables 34, Fla. Briefly discusses fishing in the Chesapeake Bay giving special emphasis to: decline in commercial landings of croaker and gray sea trout; value of the oyster industry; abundant seafoods;

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Virginia Fisheries Laboratory activities; oyster disease studies; blue crab spawning probe; causes of reduced shad and croaker catches; disappearance of the croaker; and ever-increasing sport fishery. The author states that "These are but a few of the fascinating problems the biologists have pledged themselves to solve. The quest will lead them to follow many trails. The answers should benefit not only Virginia, but may contribute to the welfare of the nation and the world. Whether or not it can honestly claim the title 'The world's best fishin' hole,' the Chesapeake is well on the way to getting the scientific attention it deserves."

World Sea Fisheries, by Robert Morgan, 307 pp., illus., printed. Pitman Publishing Corporation, 2 West 45th Street, New York 36, N. Y.; also London, England, 1956. This book describes the fisheries of the world on a rather comprehensive basis considering the scope of the subject and the fact there are only 292 pages of text. The limitation permits coverage of only the more important matters, with details left to the more specialized reports on the subject. The first of three sections--Physical Environment--discusses the physical conditions, the fisheries potential, the economically-important fish, and the coastal zones and their influence. The second--Techniques and their World Distribution--covers fishing methods and craft used in demersal fishing, processing and transportation, and fishing ports. The third--Fisheries of the World's Regions--handles the subject by continents and the more significant areas within them after setting up evaluating criteria. These include technical development in terms

of craft, gear, processing methods, degree of use of available resources, etc.; total production; and the importance of the fisheries to the domestic economy. The final chapter discusses future possibilities with respect to fish farming, international agreements, and improved catching, processing, and distributing techniques. An appendix brings summarized production by countries up through 1953, and there is a 13-page index. Sixteen halftone plates and 61 figures help to clarify the text, and most chapters end with a list of references to specialized reports.

--A. W. Anderson

#### TRADE LIST

The Office of Intelligence and Services, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., has published the following trade list. Copies of this list may be obtained by firms in the United States from that office or from Department of Commerce field offices at \$2 a list.

Canneries--Japan, 16 pp. (October 1956). The canned foods industry of Japan consists of 450 canners, half of which specialize in canned marine products. The pack of canned foods included more than 9.9 million cases (48 cans) of canned marine products. Exports of canned marine products in 1955 amounted to 62,200 metric tons, valued at US\$45.7 million. The list includes all known canners at the time of publication, but is subject to change without notice. The name of the cannery, address, branch offices, products canned, annual production, and daily productive capacities are some of the data included in the list.

#### CORRECTION

In the July 1956 issue of Commercial Fisheries Review, page 109, the listing of the publication Lax-fisket och Laxbestandet i Ostersjoområdet Under Senare År (The Salmon Catch and the Salmon Stock in the Baltic during Recent Years) incorrectly showed two authors. Only one author should have been shown: Dr. Gunnar Alm.



Editorial Assistant--Ruth V. Keefe

Illustrator--Gustaf T. Sundstrom

Compositors--Jean Zalevsky and Helen Joswick

\*\*\*\*\*

Photograph Credits: Page 27 --Rex Gary Schmidt; page 32--Jack Schott; outside back cover--The Great Atlantic and Pacific Tea Company. Photographs on pages not mentioned were obtained from the Service's file and the photographers are unknown.

## CONTENTS (CONTINUED)

	Page		Page
<b>TRENDS AND DEVELOPMENTS (Contd.):</b>		<b>FOREIGN (Contd.):</b>	
Pacific Oceanic Fishery Investigations (Contd.):		El Salvador (Contd.):	
Research for Third Quarter 1956 (July 1-September 30, 1956) .....	48	Regulations Implementing Fisheries Development	
Salmon:		Law Published .....	67
1956 Pack 25 Percent Higher Than in 1955 .....	49	French Cameroons:	
South Atlantic Exploratory Fishery Program:		Canned Sardine Market .....	68
Florida East Coast Survey for Royal-Red Shrimp		French Equatorial Africa:	
Continued (M/V <i>Combat</i> Cruise 5) .....	50	Canned Sardine Market .....	68
U. S. Fish Catch May Set All-Time Record in 1956 ..	51	French West Africa:	
United States Fishing Fleet Additions .....	51	Tuna Catch Quota for Second Season .....	69
U. S. Foreign Trade:		Iceland:	
Edible Fishery Products, August 1956 .....	52	Iced-Fish Trade Discouraged in Favor of Deliveries	
Groundfish Fillets Imports Reach Record High in		to Freezing Plants .....	69
October 1956 .....	52	New Trawlers May Be Financed by Foreign Loans	69
Tuna Canned in Brine Imports Under Quota Proviso	53	Japan:	
Wholesale Prices, October 1956 .....	53	Fishery Research Ship Departs for Brazil .....	70
<b>FOREIGN:</b> .....	56	North Pacific Factoryship King Crab Meat Pack	
International:		Through August 1956 .....	70
Air Cargo Perishable Foods Packages to Have		Research Ship to Survey Western Atlantic Fisheries	70
Distinctive Label .....	56	Research Ship Participates in Tuna-Tagging Pro-	
Food and Agriculture Organization:		gram .....	71
Fishery Research Vessels Designed by FAO Naval		Tuna Vessel to Fish in Atlantic Ocean .....	71
Architects. ....	56	<b>Mexico:</b>	
International Council for Exploration of the Sea:		West Coast Shrimp Fishery for 1955/56 Profitable	72
International Cooperation Recommended to Con-		Shrimp Fishery Trends, October 1956 .....	72
serve North Sea Herring Stock .....	57	Merida Shrimp Fishery Trends, July-September	
International North Pacific Fisheries Commission:		1956 .....	72
Five-Month Survey of North Pacific Salmon Stocks		Some Fishery Products Added to Import Duty List	73
Completed .....	58	Tuna Canning Plant at Cape San Lucas Has Good	
International Pacific Salmon Conference:		Season .....	73
Canada-United States Agreement on Pink Salmon		<b>Norway:</b>	
Conservation .....	58	Factoryship Fishes For Sand Launce .....	73
Agreements:		Canned Brisling Pack Much Lower For 1956 .....	74
Soviet-Iran Fisheries Agreement .....	59	Terramycin Tested on Whale Meat .....	74
Soviet-Japanese Peace Agreement Activates		<b>Panama:</b>	
Fishing Treaty .....	60	New Vessels Being Built .....	74
Whaling:		Fillet Exports .....	74
Expeditions for 1956/57 .....	60	Shrimp Cooperative Builds Steel Trawler .....	75
Joint Japanese-Chilean Whaling Venture Planned ..	61	<b>Republic of the Philippines:</b>	
Argentine Republic:		Canned Herring and Mackerel Removed From	
Canned Sardine Market .....	61	Import Control .....	75
Australia:		<b>Portugal:</b>	
Pearl Shell Beds to be Surveyed .....	62	Canned Fish Exports, January-July 1956 .....	75
Scallop Resource Found Off Queensland .....	62	Canned Fish Pack, January-May 1956 .....	76
Bahama Islands:		Fisheries Trends, July 1956 .....	76
Sponge Beds to be Opened April-June 1957 .....	63	Landings of Fishery Products in Portugal, Madeira,	
Belgium:		and Azores, 1955 .....	76
Canned Sardine Market .....	63	New Fish Canning Regulations .....	77
Brazil:		<b>Singapore:</b>	
Foreign Fishing Vessels Under Contract to Fish in		Port Facilities for Japanese Fishing Vessels	
Brazilian Waters .....	64	Restricted .....	78
Japanese Fishing Vessel Supplies Tuna to City of		<b>Spain:</b>	
Recife .....	65	Fisheries Trends, September 1956 .....	79
Canada:		Tuna Catch Good for 1956 Season .....	79
British Columbia Herring Fishery Outlook for		<b>Tunisia:</b>	
1956/57 .....	65	Shrimp Production, 1955 .....	80
Fish Inspection Act Revised .....	66	<b>Turkey:</b>	
Fishery Scientists Predict Disappearance of West		Exports of Fishery Products Encouraged .....	80
Greenland Cod .....	66	Union of South Africa:	
Ecuador:		Antarctic Whaling Fleet May Be Sold to Japan ...	80
Shrimp Industry Eligible for Loans .....	67	U. S. S. R.:	
El Salvador:		New Diesel Trawlers to Have Canning Plants ....	81
Fishing Company's License Suspended .....	67	Scientists Use Light to Catch Fish .....	81
		Stern-Trawling Factoryship and Diesel Trawlers	
		Completed .....	81

Contents Continued on Back Cover

## PREPARATION, FREEZING, AND COLD STORAGE OF FISH, SHELLFISH, AND PRECOOKED FISHERY PRODUCTS

Fishery Leaflet 430 (Refrigeration of Fish - Part 4, "Preparation, Freezing, and Cold Storage of Fish, Shellfish, and Precooked Fishery Products"), is one of a series of five leaflets on the refrigeration of fish. This leaflet deals in detail



Coated raw fish sticks leaving breeder machine enter right-angle conveyor belt and are carried to the continuous cooker. Girl at left is examining breaded product for possible defects.

with the various processing and freezing operations developed by the widely-diversified fishing industry. Section one of the leaflet takes up the preparation of fish for the markets as practiced in various sections of the United States. Section 2 deals with shellfish and the processing required for each marketed form. Section 3 includes similar details on such rapidly-growing "heat and serve" or "ready-to-eat" fishery products as breaded shrimp, fish sticks, and many others.

In addition to Part 4 of this series, Part 3, "Factors to be Considered in the Freezing and Cold Storage of Fishery Products"--Fishery Leaflet 429--has been released and both leaflets may be obtained free from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.



### CONTENTS (CONTINUED)

	Page		Page
<b>FOREIGN (Contd.):</b>		<b>FEDERAL ACTIONS (Contd.):</b>	
United Kingdom:		White House:	
Continues Imports of Japanese Canned Salmon . .	82	Tariff Commission's Recommendations for Increased Duties on Groundfish Fillets Rejected .	88
New Frozen Fish Processing Plant for Hull . . .	82	<b>FISHERY INDICATORS:</b> . . . . .	90
Ninth Trawler for Russia Launched . . . . .	82	Chart 1 - Fishery Landings for Selected States . .	90
<b>FEDERAL ACTIONS:</b> . . . . .	83	Chart 2 - Landings for Selected Fisheries . . . .	91
Federal Trade Commission:		Chart 3 - Cold Storage Holdings and Freezings of Fishery Products . . . . .	92
Salmon Price Fixing in Puget Sound Area Ordered Stopped . . . . .	83	Chart 4 - Receipts and Cold-Storage Holdings of Fishery Products at Principal Distribution Centers	93
Department of the Interior:		Chart 5 - Fish Meal and Oil Production - U. S. and Alaska . . . . .	93
U. S. Fish and Wildlife Service:		Chart 6 - Canned Packs of Selected Fishery Products	94
Reorganization Becomes Effective . . . . .	84	Chart 7 - U. S. Fishery Products Imports . . . . .	95
Organization Described . . . . .	85	<b>RECENT FISHERY PUBLICATIONS:</b> . . . . .	96
Fisheries Loan Regulations Changed . . . . .	86	Fish and Wildlife Service Publications . . . . .	96
Department of the Treasury:		Miscellaneous Publications . . . . .	98
Bureau of Customs:			
Comments Requested on Appraisal of Imported Articles Under Customs Simplification Act of 1956 . . . . .	87		

